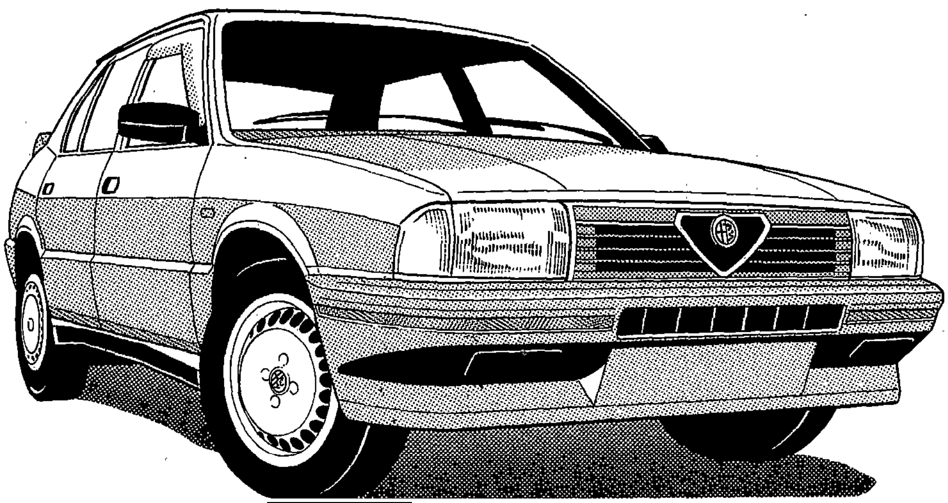
WORKSHOP MANUAL

Alfa 33 **MANUAL SUPPLEMENT**

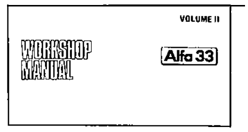
models 33



ASSISTENZA TECNICA Alfa Romeo

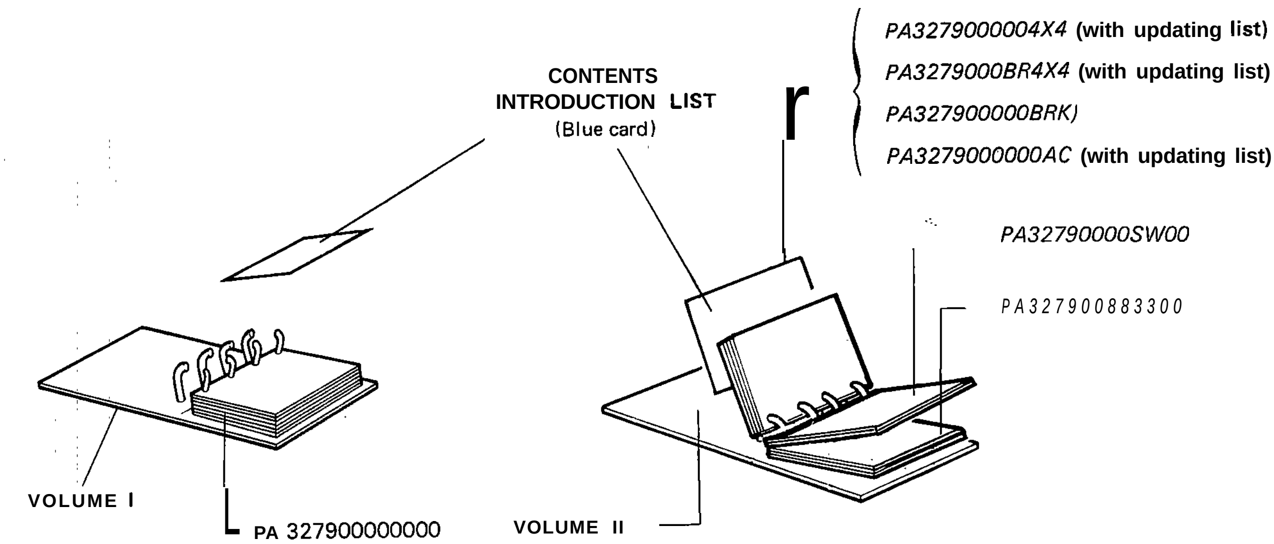
PA333500883300

May 1988



Instructions for the insertion of the technical data in the binders

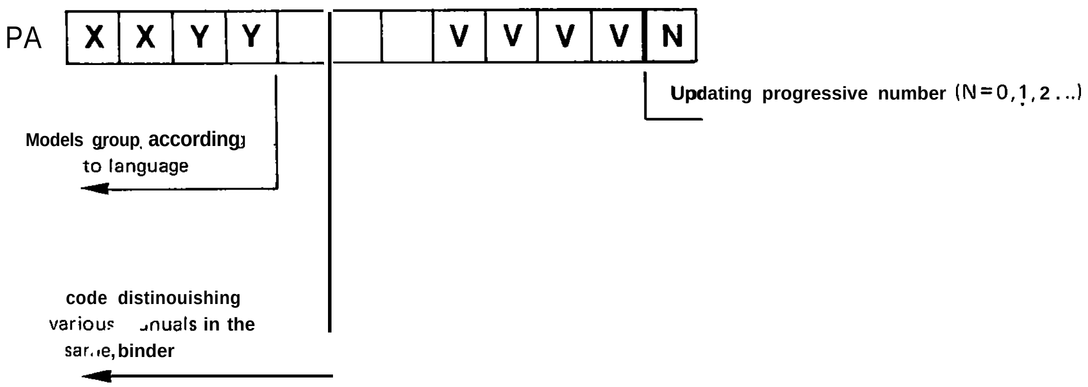
When inserting the updating pages in the Alfa 33 VOLUME II binder, it is advisable to proceed as shown in the diagram below and to follow the order indicated.



Detailed contents:

PA32790000004X4	*"Workshop Manual* Alfa 33 4 x 4*"*
PA3279000BR4X4	*"Workshop Manual* Alfa 33 4 x 4 giardinetta*"*
PA327900000BRK	*"Workshop Manual* Alfa 33 giardinetta*"*
PA3279000000AC	*"*installation Instructions* Alfa 33 r conditioner*"*
PA32790000TD00	*"Workshop Manual* 33 1.8 TD*"*
PA327900003300	*"Workshop Manual-* **models** 33*"*
PA32790000SW00	*"Workshop Manual* **models** Sport Wagon
PA327900883300	*"Workshop Manual* **models** 33

NOTE: For **correct interpretation of the issue number, refer to the following code figures:**



FOREWORD

This manuals is intended for models 33 1.3, 33 1.3 S, 33 1.5 TI, 33 1.7 IE, 33 1.7, 33 1.8 TD, 33 1.5 4x4. It complements the manuals referring to the corresponding (Alfa models indicated here below:

PA32 7900000000	*"WORKSHOP MANUAL*	Alfa 33 "
PA3279000004x4	*"WORKSHOP MANUAL*	Alfa 33 4x4 "
PA3279000B R4x4	*"WORKSHOP MANUAL*	Alfa 33 4x4 giardinetta"
PA327900000B RK	*"WORKSHOP MANUAL*	Alfa 33 giardinetta"
PA32790000TD00	*"WORKSHOP MANUAL*	33 1.8 TD
PA32 7900003300	*"WORKSHOP MANUAL*	*- models* 33

Key to symbols:

Alfa 33 ◀ *means that the corresponding Group in the basic manual Alfa 33 should be referred to, for all details not dealt with specifically in this manual.*

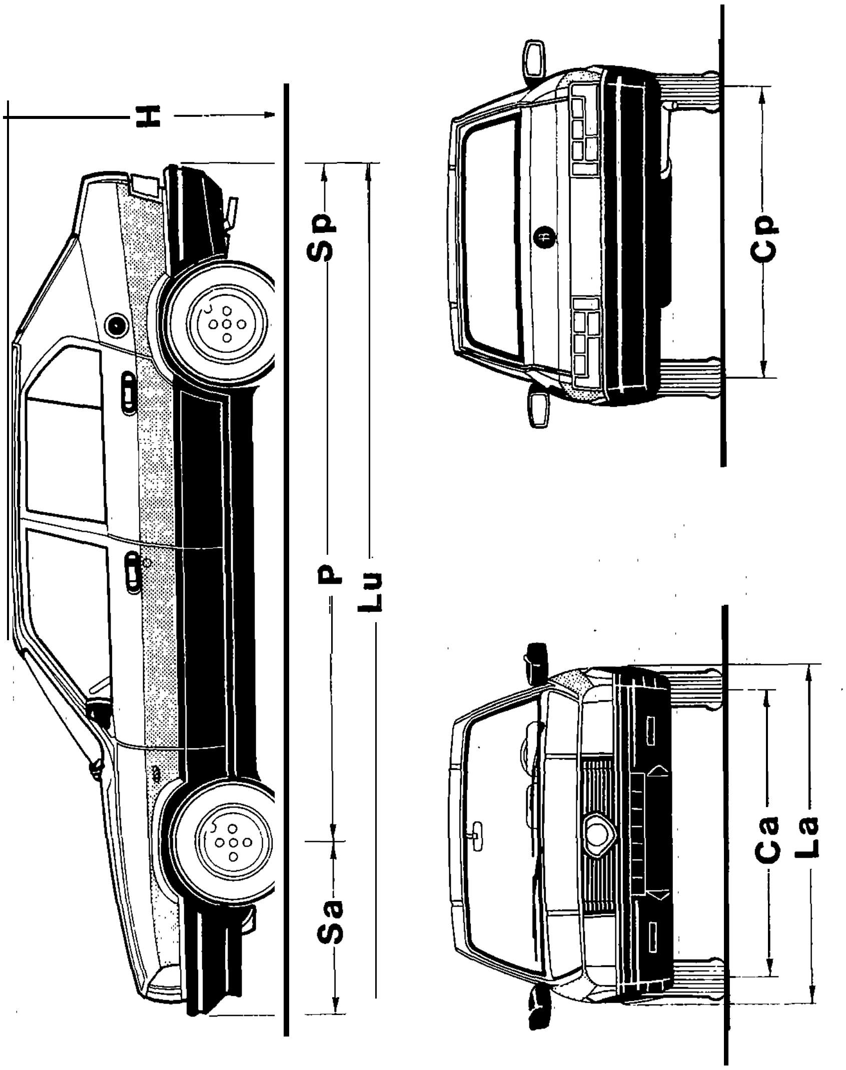
QUICK REFERENCE INDEX

GROUP 00

CONTENTS

(*) See: "REPAIR MANUAL Alfa 33 " VOLUMES I and II - Group 00

GENERAL VIEW



DIMENSIONS AND WEIGHTS

		ENGINES WITH ONE CARBURETOR		ENGINES WITH TWO CARBURETORS				ENGINES WITH ELECTRONIC FUEL INJECTION		ENGINES WITH TURBO COMPRESSOR
Model		33 • *	33 1.3	33 1.3 s	33 1.5 TI	33 1.5 axa	33 1.7 •	33 1.7 IE	33 1.7 •	33 1.5 TO
Identification number		908.260	908.060 908.061 A	908.080	908.100 908.110 908.101▲	908.220	908.160 908.170 908.161▲	908.140 908.200△ 908.150△	908.180△	908.120
Wheelbase P	(mm)	2470	2465							2455
Track Front Ca Rear cp	(mm)	1366 1362	1367 1364			1362 1375	1367 1364			1397 1364
Overall length Lu	(mm)	4015								4040
Overhang Front Sa Rear SP	(mm)	800 760	790 760							825 760
Overall width La	(mm)	1612								
Height (unladen) H	(mm)	1340			1345	1370	1345			
Min. steering radius	(mm)	5500								5350
Kerb weiaht	(kg)	910				970	930			1010
Max. allowed gross weight	(kg)	1335				1395	1355			1435
Payload	(kg)	3 5 5								
Max. allowed axle gross weight Front Rear	(kg)	800 800			800 900					
Max. towing gross weight	(kg)	1000				1100	1000			1100
Seating capacity Front Rear		2 3								

(A) With ecological materials for countries where antipollution regulations are in force
(*) With 1.2 engine not marketed in all countries
[A] *With* ecological *materials.*

MODEL VARIATION

			ENGINES WITH ONE CARBURETOR				ENGINES WITH TWO CARBURETORS					
Modal			33● *		33 1.3		33 1.3 S		33 1.5 Ti		33 1.5 axa	
Body			5 door saloon									
Drive			L	R	L	R	L	R	L	R	L	R
Identification NO.		Label type and location: – on certification label and – on identification label	908.260	—	908.060 / 908.061▲	—	908.080	—	908.100 / 908.101▲	908.110	908.220	—
Chassis No.	Type approval No.	Label type and location: on identification label	905AB		905A1G		905A1H		905A2V		905A2T	
		Label type and location: – on intermediate bulkhead label	905A00		905A10				905A20			
	Serial No	Label type and location: – on intermediate bulkhead label	—	—	▲	—	05410589	—	05414309 / ▲	05411133	05414275	—
Engine No.	Type and serial NO.	Label type and location: – on cylinder block label	30585 from 0000001		30586 from 0000001		30587 from 0000001		30588 from 0000001			
Tire dimensions			165/70 SR 13						175/70 RI 3 82T			
Rim dimensions			5½ J x 13"									

(A) With ecological materials
(*) With 1.2 engine not marked in all countries

MODEL VARIATION

Model		Sport Wagon							
Versions		33 1.3 S				33 1.5 4x4			
Body		5 DOOR STATION WAGON							
Drive		L	R	L	R	L	R	L	R
Identification No.	– on certification label – on identification label	906.600	–	908.600	–	908.800 908.801 ▲	–	908.800 908.801 ▲	–
Chassis No. – Type approval No.	– on identification label	905A1D		905A1F		905A2S		905A2U	
Chassis No. – Type approval No.	– on intermediate bulkhead label	905A10		905A10		905A20		905A2O	
Chassis No. – Serial No	– on intermediate bulkhead label	05379411	–	–	–	05407366 ▲	–	– ▲	–
Engine No. – Type and serial No.	– on cylinder block label	30168 from 0000001		30587 from 0000001		30508 from 0000001		30588 da 0000001	
Tyres dimensions		165/70XR13				175/70R1382T			
Rim dimensions		5½J×13				5½J×13			

(Label type and location)

(A) with ecological material

MODEL VARIATION

		Label type and location								
Model			Sport Wagon							
Versions			33 1.3 S		33 1.7 ✤ Δ		33 1.7 4x4 Δ		33 1.8 TD	
Body			5 DOOR STATION WAGON							
Drive			L	R	L	R	L	R	L	R
Identification No.		– on certification label – on identification label	908.640 908.641▲	908.650	908.660	–	908.820	–	908.620	–
Chassis No.	Type approval No.	– on identification label	905A3O		905A3F		905A3G		905A4A	
		– on intermediate **bulkhead** label	905A3O		905A30		905A3O		905A40	
	Serial No.	– on intermediate **bulkhead** label	05381288 ▲	–	65407756	–	05408476	–	05381261	–
Engine No.	Type and'sérial No.	– on **cylinder block** label	30550 from 0000001		30558 from 0000001		30558 from 0000001		VM82A from 0000001	
Tyre dimensions			185/60R1482H						175/70R1382T	
Rim dimensions			5½Jx14						5½Jx13	

(A) With ecological material and electronic injection engine for countries where antipollution regulations are in force
(A) With ecological material

APPROXIMATE REFILL CAPACITIES

Model		Sport Wagon 33 1.3 S		Sport Wagon 33 1.7 IE		Sport Wagon 33 1.5 4x4 33 1.7 4x4		Sport Wagon 33 1.8 TD	
Component	Measurement unit	Kg (lb)	l (imp. gal)	Kg (lb)	l (imp. gal)	Kg (lb)	l (imp. gal)	Kg (lb)	l (imp. gal)
FUEL TANK		–	50 (11)	–	50 (11)	–	53 (11.66)	–	50 (11)
FUEL RESERVE			6.5 (1.43)	–	6.5 (1.43)	–	6.5 (1.43)	–	6.5 (1.43)
ENGINE OIL SUMP	With filter (*)	3.6 (7.94)	4 (0.88)	3.6 (7.94)	4 (0.88)	3.6 (7.94)	4 (0.88)	4.57 (10.07)	5.25 (1.15)
	Without filter (*)	3.15 (6.94)	3.5 (0.77)	3.15 (6.94)	3.5 (0.77)	3.15 (6.94)	3.5 (0.77)	4.35 (9.59)	5 (1.10)
GEARBOX - DIFFERENTIAL OIL		2.4 (5.29)	2.6 (0.57)	2.4 (5.29)	2.6 (0.57)	2.4 (5.29)	2.6 (0.57)	2.4 (5.29)	2.6 (0.57)
REAR DIFFERENTIAL OIL			–	–	–	0.9 (1.98)	1 (0.22)	–	
ENGINE COOLING SYSTEM		–	7.3 (1.61)	–	7.3 (1.61)	–	7.3 (1.61)	–	8
CONCENTRATE ANTIFREEZE QUANTITY DEPENDING ON TEMPERATURE	⟶ −15°C (+5°F) ⟶ −20°C (−4°F) −35°C (-31°F)	– – –	2.2 (0.48) 2,6 (0.57) 3.65 (0.80)	– – –	2.2 (0.48) 2,6 (0.57) 3.65 (0.80)	– – –	2.2 (0.48) 2,6 (0.57) 3.65 (0.80)	– – –	2 (0.44) 2,64 (0.58) 4 (0.88)
ANTIFREEZE QUANTITY READY FOR USE	⟶ −20°C (−4°F)	–	7.3 (1.61)	–	7.3 (1.61)	–	7.3 (1.61)	–	8 (1.76)

(*) The indicated quantity refers to periodical changes.

CHASSIS AND BODY MAINTENANCE

TECHNICAL DATA - INSPECTION AND ADJUSTMENT

Axles and suspensions

Features / Model		Sport Wagon 33 1.3 S	Sport Wagon 33 1.7 ⊕	Sport Wagon 33 1.5 4x4 / 33 1.7 4x4	Sport Wagon 33 1.8 TD
Vehicle static loading arrangement (1)	N (kg : lb)	a + B = 490 + 245 = 735 N (5_0 + 25 = 75 kg) C = 490 (50); (110)			
Front wheel alignment	mm (in)	A=-12^{+10}_{-5} ($-0.47^{+0.39}_{-0.20}$)		A=3^{+10}_{-5} ($-0.12^{+0.39}_{-0.20}$)	A=-2^{+10}_{-5} ($-0.47^{+0.39}_{-0.20}$)
Rear wheel alignment	mm (in)	B=27^{+10}_{-5} ($1.06^{+0.39}_{-0.20}$)		B=53^{+10}_{-5} ($2.09^{+0.39}_{-0.20}$)	B=33^{+10}_{-5} ($0.91^{+0.39}_{-0.20}$)
Front wheel toe-out (2) (3)	mm (in)	M − H = 4 ± 2 (0.157 ± 0.079)			M−H=2 ± 2 (0.157 ± 0.157)
Front toe-out angle		α = 0'			α = 10'
Wheel rim diameter	mm (in)	340 (13.38)	365 (14.37) (4)	340 (13.38) 365 (14.37) (4)	340 (13.38)
Rear wheel toe-in		α = [illegible] ±10'			α = 0° ±25'
Front wheel camber (3)		β = −1° ±30'			β = −1 [illegible]
Rear wheel camber (3)		β = 0° ±25'			
Front wheel caster (3)		γ = 2° ±30'			γ = [illegible] ±30'
Steering lock (3)	Outer angle	δ_1 = 27°50'			δ_1 = [illegible]
	Inner angle	δ_2 = 33°45'			δ_2 = 35°10'

(1) Load vehicle, move it up and down on suspensions a few times. Checking operations must be performed with vehicle fully set up for driving
(2) When turning a steering side rod joint 360°, M − H dimension changes by 2 mm (0.079 in).
(3) These values are referred to a vehicle in nominal driving condition, i.e. with static load.
(4) With rim 5½ J×14".

MODEL VARIATION

	ENGINES WITH TWO CARBURETORS		ENGINES WITH ELECTRONIC FUEL INJECTION				ENGINE WITH TURBO COMPRESSOR	
Model	33 1.7 ♣		33 1.7 IE		33 1.7 ♣		33 1.8 TO	
Body	5 **door saloon**							
Drive	L	R	L	R	L	R	L	R
Identification NO. — Label type and location: — on certification label and — on identification label	908.160 / 908.161▲	908.170	908.140 / 908.200▲	908.150.	905.180.		908.120	—
Chassis No. — Type approval No. — on identification label	905A3		905A3D				905A4	
Chassis No. — Type approval No. — on intermediate bulkhead label	905A30						905A40	
Chassis No. — Serial No — on intermediate bulkhead label	05411704 A	—	05410692 A	—	—	—	05411250	—
Engine No. — Type and serial NO. — on cylinder block label	30550 from 0000001		305.58 from 0000001*		305.58 from A000001		VM82A from 00001	
Tire dimensions	185/60 R1482H		185/60 R1482H				175/70 RI 382T	
Ftim dimensions	5½ J x 14"						5½ J x 13"	

(A) With ecological materials

(*) Not including numbers 908.200 / 908.150 that take the serial number A000001, as with number 908.180

MAINTENANCE SCHEDULE

The following schedule is valid for the Italian market only

N.	OPERATION	A (1)	Km/1000 10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	Notes
1	Replace engine oil and oil filter; check oil system for leaks	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(2)
2	Replace gearbox, differential and rear differential (models 1.5 4×4) oil					X				X				X				X				X	
3	Check gearbox, differential and rear differential (model 1.5 4×4) oil level			X				X				X				X				X			
4	Check and top up (if necessary) the fluid level and verify correct operation of the windscreen, headlights and rear window wash/wipe system	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(4)
5	Check brake fluid and clutch fluid level	X	X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		
6	Replace brake and clutch fluid					X				X				X				X				X	(6)
7	Check level of antifreeze mixture; test cooling circuit for leaks	X	X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		(4)
8	Replace antifreeze mixture and check cooling circuit for leaks					X				X				X				X				X	
9	Check front wheel toe-out and adjust, if necessary	X																					
10	Grease propeller shaft tunnel (models 1.5 4×4)	X		X		X		X		X		X		X		X		X		X		X	
11	Check condition of protective boots of constant velocity joints and steering joint caps	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	Check tightness of brake system tubing	X		X		X		X		X		X		X		X		X		X		X	
13	Check front brake pads (possible pad replacement)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	Check rear brake drums and linings (possible lining replacement)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(5)
15	Check hand brake travel and adjust, if necessary	X		X		X		X		X		X		X		X		X		X		X	
16	Check tyre pressures		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(4)
17	Check accelerator cable and adjust if necessary	X																					
8	Check and adjust if necessary valve clearance	X		X		X		X		X		X		X		X		X		X		X	

N.	OPERATION	A (1)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	Notes
			Km/1000																				
19	Check tension of and if necessary replace drive belts of: alternator. coolant pump and air conditioner compressor (if fitted)	X		X				X				X				X				X			
20	Replace drive belt of alternator and air conditioner compressor (if fitted)					X				X				X				X				X	
21	Replace camshaft drive belts							X						X						X			
22	Check fuel system for leaks	X		X		X		X		X		X		X		X		X		X		X	
23	Clean and check air filter element		X		X		X		X		X		X		X		X		X		X		(3)
24	Check tightness of air intake system downstream from the air flow gauge (petrol Injection only)			X		X		X		X		X		X		X		X		X		X	
25	Replace fuel filter (where necessary)					X				X				X				X				X	
26	Replace air filter cartridge			X		X		X		X		X		X		X		X		X		X	
27	Clean carburetor jets and crankcase ventilation system backfire shield			X		X		X		X		X		X		X		X		X		X	
28	Check exhaust emissions	X		X		X		X		X		X		X		X		X		X		X	
29	Check and if necessary adjust ignition timing			X		X		X		X		X		X		X		X		X		X	
30	Inspect and clean spark plugs		X		X		X		X		X		X		X		X		X		X		
31	Replace spark plugs			X		X		X		X		X		X		X		X		X		X	
32	Check battery electolyte level, top up, tighten and grease terminals			X		X		X		X		X		X		X		X		X		X	(4)
33	Lubricate door and hood/backdoor hinges. Adjust strikers, as necessary. Greasing of hood and backdoor catches			X		X		X		X		X		X		X		X		X		X	
34	Check underbody and body work			X		X		X		X		X		X		X		X		X		X	
35	*Test vehicle*	X		X		X		X		X		X		X		X		X		X		X	

(1) A = 1500÷2500 Km (621÷932 mi)

(2) To be performed in any case every 6 months. Check oil level frequently when refuelling

(3) Check more frenquently if driving in very dust areas

(4) Check frequently when refuelling

(5) To be performed more frequently when driving under particular stress conditions (sport driving) or on hilly roads

(6) To be performed in any case every 12 months

MAINTENANCE SCHEDULE

The following schedule is not valid for the Italian market and for countries where antipollution regulations are in force

N.		A 1)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	Notes
			Km/1000																				
1	Replace engine oil and oil filter; check oil system for leaks	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(2)
2	Replace gearbox, differential and rear differential (model 1.5 4X4) oil	X				X				X				X				X				X	
3	Check gearbox, differential and rear differential (models 1.5 4X4) oil level			X				X				X				X				X			
4	Check and top up (if necessary) the fluid level and verify correct operation of the windscreen, headlights and rear window wash/wipe system	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(4)
5	Check brake fluid and clutch fluid level	X	X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		
6	Replace brake and clutch fluid					X				X				X				X				X	(6)
7	Check level of antifreeze mixture; test cooling circuit for leaks	X	X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		(4)
8	Replace antifreeze mixture and check cooling circuit for leaks					X				X				X				X				X	
9	Check front wheel toe-out and adjust, if necessary	X																					
10	Grease propeller shaft tunnel (models 1.5 4X4)	X		X		X		X		X		X		X		X		X		X		X	
11	Check condition of protective boots of constant velocity joints and steering joint caps	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	Check tightness of brake system tubing	X		X		X		X		X		X		X		X		X		X		X	
13	Check front brake pads (possible pad replacement)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	Check rear brake drums and linings (possible lining replacement)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(5)
15	Check hand brake travel and adjust, if necessary	X		X		X		X		X		X		X		X		X		X		X	
16	Check tyre pressures	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(4)
17	Check accelerator cable and adjust if necessary	X																					
18	Check and adjust if necessary valve clearance	X		X		X		X		X		X		X		X		X		X		X	

N.	OPERATION	A (1)	Km/1000																				Notes
			10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	
19	Check tension of and if necessary replace drive belts of; alternator. coolant pump and air conditioner compressor (if fitted)	X		X				X				X				X				X			
20	Replace drive belt of alternator and air conditioner compressor (if fitted)					X				X				X				X				X	
21	Replace camshaft drive belts							X						X						X			
22	Check fuel system for leaks	X		X		X		X		X		X		X		X		X		X		X	
23	Clean and check air filter element		X		X		X		X		X		X		X		X		X		X		(3)
24	Check tightness of air intake system downstream from the air flow gauge (petrol injection only)			X		X		X		X		X		X		X		X		X		X	
25	Replace fuel filter (where necessary)					X				X				X				X				X	
26	Replace air filter cartridge			X		X		X		X		X		X		X		X		X		X	
27	Clean carburetor jets and crankcase ventilation system backfire shield			X		X		X		X		X		X		X		X		X		X	
28	Check exhaust emissions	X		X		X		X		X		X		X		X		X		X		X	
29	Check and if necessary adjust ignition timing	X		X		X		X		X		X		X		X		X		X		X	
30	Inspect and clean spark plugs		X		X		X		X		X		X		X		X		X		X		
31	Replace spark plugs			X		X		X		X		X		X		X		X		X		X	
32	Check battery electrolyte level, top up, tighten and grease terminals	X		X		X		X		X		X		X		X		X		X		X	(4)
33	Lubricate door and hood/backdoor hinges. Adjust strikers, as necessary. Greasing of hood and backdoor catches	X		X		X		X		X		X		X		X		X		X		X	
34	Check underbody and body work			X		X		X		X		X		X		X		X		X		X	
35	Test vehicle	x		x		X		X		X		X		X		X		X		X		X	

(1) A = 1000 ÷ 1500 km (621 ÷ 932 mi)
(2) To be performed in any case every 6 months. Check oil level frequently when refuelling
(3) Check more frequently if driving in very dusty areas
(4) Check frequently when refuelling
(5) To be performed more frequently when driving under particular stress conditions (sport driving) or on hilly roads
(6) To be performed in any case every 12 months

MAINTENANCE SCHEDULE

The following schedule is valid only for those countries where antipollution regulations are in force

N.	OPERATION	A (1)	Km/1000																				Notes
			10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	
1	Replace engine oil and oil filter; check oil system for leaks	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(2) (7) E
2	Replace gearbox and differential oil	X				X				X				X				X				X	
3	Chec<gearbox and differential oil level			X				X				X				X				X			
4	Check and top up the fluid level of windscreen, and rear window wash. Check correct operation of the system	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(4)
5	Check brake fluid and clutch fluid level	X	X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		
6	Replace brake and clutch fluid					X				X				X				X				X	(7)
7	Check and top up the cooling system and verify system tightness	X	X	X	X		X	X	X		X	X	X		X	X	X		X	X	X		(4) E
8	Replace cooling fluid and check cooling circuit for leaks					X				X				X				X				X	(5) E
9	Check all bolts for tightness	X																					
10	Check front wheel toe-out and adjust, if necessary	X																					
11	Check condition of protective boots of constant velocity joints and steer-ing box	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	Inspect	X		X		X		X		X		X		X		X		X		X		X	
13	Check of pads wear degree and rear drums friction gaskets. Replace if necessary		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(6)
14	Check and if necessary adjust hanbrake travel	X		X		X		X		X		X		X		X		X		X		X	
15	Check tire pressure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	(4)
16	Check accelerator cable adjust if necessary	X																					
17	Check integrity and if necessary adjust alternator control and conditioner compressor (if mounted belts).	X		X				X				X				X				X			E

N.	OPERATION	A (1)	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	Notes
			Km/1000																				
18	Check valve timing and timing belt tensions	X		X		X		X		X		X		X				X		X		X	E
19	Replace alternator control and conditioner compressor (if mounted) belts					X				X				X				X				X	E
20	Replace timing control belts							X						X						X			
21	Check tightness of fuel supply system. Check evaporation system	X	X	X		X		X		X		X		X		X		X		X		X	E
22	Check and clean air filter element		X		X		X		X		X		X		X		X		X		X		(3) E
23	Replace air filter element			X		X		X		X		X		X		X		X		X		X	E
24	Check tightness of air supply system downstream from the air flow gauge	X	X	X		X		X		X		X		X		X		X		X		X	E
25	Replace fuel filter	X				X				X				X				X				X	E
26	Check and, if necessary adjust, idle speed, ignition timing and exhaust emissions	X		X		X		X		X		X		X		X		X		X		X	E
27	Clean and check spark plugs		X		X		X		X		X		X		X		X		X		X		E
28	Replace spark plugs			X		X		X		X		X		X		X		X		X		X	E
29	Check and if necessary tap up battery electrolyte level, tighten and grease terminals	X	X	X		X		X		X		X		X		X		X		X		X	(8) E
30	Check head lamps beam aiming and adjust it, if necessary	X																					
31	Lubricate door and hood hinges. Adjust strikers, as necessary. Grease the hood locking catches.	X	X	X		X		X		X		X		X		X		X		X		X	
32	Check underbody and body work			X		X		X		X		X		X		X		X		X		X	
33	Test vehicle	X	X	X		X		X		X		X		X		X		X		X		X	

No.	OPERATION	A (1)	Km11000																				Notes
			10	20	30	40	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**	**160**	**170**	**180**	**190**	**200**	
34	Check sensor of oxygen contents in exhaust gas											X										X	E
35	Replace catalyst of exhaust gas											X										X	(8) E

(1) A= 1000÷1500 K m

(2) Check oil level every 500 km and when refuelling

(3) Check more frequently il driving in very dusty areas

(4) Check frequently when refuelling

(5) To be performed in any case every two years

(6) To be performed more frequently when driving under particular stress coditions (sport driving) or on hilly roads

(7) To be performed in any case every 12 months

(8) To be performed in any case every 5 years

E) Operation relevant to emission control

MAINTENANCE SCHEDULE

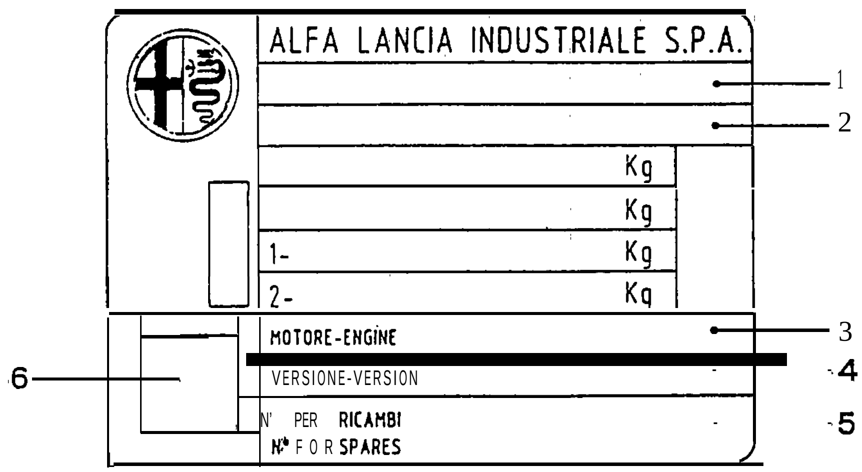
The present periodical maintenance schedule, for all markets, is applicable to vehicles equipped with SERVICE BOOKLET having the new programmed maintenance.

N.	OPERATION	A (1)	Km/1000 20	40	60	80	100	120	140	160	180	200	Note
1	Replace engine oil and oil filter; check tightness of lubricating circuit (every 10.000 km for diesel versions)	X	X	X	X	X	X	X	X	X	X	X	(2)
2	Replace oil in gearbox - differential (and rear differential in 4wd versions)			X		X		X		X		X	
3	Check oil level in gearbox - differential (and rear differential in 4wd versions)		X		X		X		X		X		
4	Check fluid level of windscreen, headlights and rear window wipers. Check correct operation of system	X											(4)
5	Check brake and clutch fluid levels	X	X	X	X	X	X	X	X	X	X	X	(6)
6	Check antifreeze mixture level and cooling system tightness	X											(4)
7	Replace antifreeze mixture				X			X			X		(7)
8	Check toe-out for front wheels	X											
9	Grease propeller shaft sleeve (4wd versions)		X	X	X	X	X	X	X	X	X	X	
10	Check conditions of semiaxle's protective boots and steering joint hoods	X	X	X	X	X	X	X	X	X	X	X	
11	Check tightness of braking system pipes	X	X	X	X	X	X	X	X	X	X	X	
12	Check wear of front brake pads		X	X	X	X	X	X	X	X	X	X	(5)
13	Check wear of friction gaskets for rear brake drums			X		X		X		X		X	(5)
14	Check hand brake travel	X	X	X	X	X	X	X	X	X	X	X	
15	Check adjustment of accelerator cable	X											
16	Check valve clearance (if required)		X	X	X	X	X	X	X	X	X	X	
17	Clean injectors (only in diesel engine vehicles)			X		X		X		X		X	
18	Check glow plugs (only in diesel engine vehicles)			X		X		X		X		X	
19	Check axial and radial play of supercharger rotor shaft and by-pass valve (only in diesel engine vehicles)						X					X	
20	Check idle r.p.m. (petrol versions)	X	X	X	X	X	X	X	X	X	X	X	
21	Check idle r.p.m. (diesel engine versions)	X											
22	Replace exhaust gas oxygen sensor (Lambda sensor) (only in vehicles with catalytic converters)						X					X	
23	Check integrity and tension of cooling liquid pump, alternator and conditioner compressor (if installated) drive belt	X	X	X	X	X	X		X		X	X	

N.	OPERATION	A (1)	Km/1000 20	40	60	80	100	120	140	160	180	200	Note
24	Replace timing belts				X			X			X		
25	Check tightness of fuel supply circuit Check fuel vapour emission control circuit (if installed)	X											
26	Check air filter cartridge		X		X		X		X		X		(3)
27	Check tightness of air supply system downstream the air flow meter (only in fuel injection engines)	x											
26	Replace fuel filter (where foreseen)		x	x	x	X	X	X	X	X	X	X	
29	Replace air filter cartridge			X		X		x		X		X	
30	Clear flamedamper in exhaust gas recycling circuit (except in diesel or fuel injection cars)			X		X		x		X		X	
31	Check exhaust emission (only in vehicles with catalytic converter)	X	X	X	X	x	x	x	X	X	X	X	
32	Check spark advance (except diesel models)	x	x	x	x	x	x	X	X	X	X	X	
33	Replace spark plugs (except diesel engines)		X	X	X	X	x	X	X	X	X	X	
34	Check electric connections in engine compartment (condition and positipn of connectors and hoods)			X		X		x		X		X	
36	Grease door and hood hinges, grease hood locking catches.		X	X	X	X	x	X	X	X	X	X	
36	Test vehicle	X	x	X	X	X	x	x	X	X	X	X	

(1) A = 1500 - 2500 Km
(2) Check oil level every year and when refuelling
(3) Check more frequently if driving in very dusty areas
(4) Check frequently when refuelling
(5) To be performed more frequently when drivlng particular in stress conditions (sport drlving) or on mountain roads
(6) To be replaced in any case every 12 months
(7) To be performed in any case every 2 years

NEW IDENTIFICATION LABEL



1 - Homologation code

2 - Body marking

3 - Engine type mumber

4 - Base type and vehicle version

5 - Serial number with relation to finished units: necessary when ordering spare parts, for identification of production or assemply plant and as reference for introduction of modifications.

6 Marking of correct value of smoke absorption coefficient (for diesel engines'only).

BODY MARKING

ZAR 905A00 + 05455.737
(1) (2) (3)

(1) - Constructor identification code

(2) - Vehicle model

(3) - Chassis serial number

MODEL VARIATIONS

(According to E.E.C. markings adopted on new identification labels)

		ENGINES WITH ONE CARBUTEROR		ENGINES WITH TWO CARBURETORS		
Model		33• *	33 1.3	33 1.3 s	33 1.9 TI	33 1.5 4x4
Body		5 DOOR SALOON				
Drive		LEFT	LEFT	LEFT	LEFT/RIGHT	LEFT
vehicle type No.	— on identification label	905AP	905A1G	905A1H	905A2V	905A2T
	— on service compartment front cross member, right side, horizontal plane.	905A00	905A10		905A20	
Chassis serial No:	— on service compartment front cross member, right side, horizontal plane	05.455.737				
Engine type and serial No.	— on special rised block on engine block, upper right part flywheel side	30565 0000001	30566 0000001	30567 0000001	30588 0000001	
Tyre dimensions		165/70 SR 13			175/70 R13 82T	
Rim dimensions		5½ J x 13”				

(*) With 1.2 engine *commercialised* only in certain countries.

MODEL VARIATIONS

(According to E.E.C. marking adopted on new identification labels)

		ENGINES WITH TWO CARBURETORS	ENGINES WITH ELECTRONIC FUEL INJECTION		ENGINES WITH TURBO COMPRESSOR
Model		33 9.7 ●	33 1.7 IE	33 1.7 ●	33 1.8 TD
Body		5 DOOR SALOON			
Drive		left/right	leftlright	leftlright	left
vehicle type No.	— on identification label	905A3	905A3D		905A4
	— on service compartment front cross member, right side, horizontal plane.	905A30			905A40
Chassis serial No.	— on service compartment front cross member, right side, horizontal plane	05.455.737			
Engine type and serial No.	— on special raised block on engine block, upper right part flywheel side	30550 from 0000001	305.58 from 0000001*	305.58 from A000001	VM82A from 00001
Tyre dimensions		185/60 RI 482H	185/60 R1482H		175/70 R1382T
Rim dimensions		5½ J x 14"			5½ J x 13"

(*) Excluding Nos. 908.2201908.150 which take serial No. A000001 as with No. 908.180.

RECOMMENDED FUEL AND LUBRICANTS

00-I 1

FUEL

For correct engine functioning the specification is for premium grade or unleaded petrol: RON ⩾ 95.

For models 33 1.7 ♦ and 33 1.7 IE with electronic injection and catalytic convertor only unleaded petrol to the following specifications must be used:

— Octane Number (Research method) R.O.N. ⩾ 95 (for Switzerland, Sweden versions)
— Octane Number (Research method) R.O.N. ⩾ 91 (for Australia version)

WARNING:
Never neither in an emergency nor in small quantities use conventional lead petrol. To do so will result in permanent damage to the exhaust gas catalyzer.
To prevent the tank from being accidentally filled with lead petrol, the inlet filler has been designed in such a way as to permit, the entry of only special filler spouts fitted exclusively on unleeded petrol pumps. Should the tank be filled with even a small quantity of lead petrol, do not start the engine, but proceed to the complete emptying of the tank and the fuel delivery system.

FLUIDS AND LUBRICANTS

As per Alfa 33 except:

Type	Application	Classification	Name			Notes
			AGIP	IP	SHELL	
Oil	Engine - 01	API SF/CC MIL L46152B CCMC G2D1	Sint 2000 SAE 10W/40	Sintiax SAE 10W/40	Super Plus~ Motor Oil SAE 15W/50	Environmental temperature — 18 ÷ + 40°C
	Gearbox - 13 Differential	SAE J 306a APIGL-5	Rotra MP SAE 80W/90	Pontiax HD SAE 80W/90	Spirax HD SAE 80W/90	Environmental temperature — 30 ÷ t 40°C

APPROXIMATE REFILL CAPACITIES

Models		33 ♦ * — 33 1.3 — 33 1.3 S — 33 1.5 TI — 33 1.5 4x4 — 33 1.7 ♦ — 33 1.7 IE		33 1.8 TD	
Components	Measurement unit	Kg	Liters	Kg	Liters
FUEL TANK		—	50	—	50
FUEL RESERVE		—	6,5		6,5
ENGINE OIL SUMP	With filter (●)	3,6	4	4.57	5,25
	Without filter (●)	3,15	3.5	4,35	5
GEARBOX - DIFFERENTIAL OIL		2,4	2,6	2,4	2,6
REAR DIFFERENTIAL OIL (4×4 models)		0,9	1,0	—	—
ENGINE COOLING SYSTEM		—	7,3	—	7,5
CONCENTRATE ANTIFREEZE QUANTITY DEPENDING ON TEMPERATURE	→ – 15 °C → – 20 °C → – 35°C	—	2,2 2,6 3,65	—	2 2,64 4
ANTIFREEZE QUANTITY READY FOR USE	→ - 20 %	—	7,3	—	7,5

(●) The indicated quantity refers to periodical changes
(*) Not marketed in all countries with 1.2 engine.

ENGINE MAINTE#NANCE

BASIC 'MECHANICAL SYSTEM

CHECK AND POSSIBLE ADJUSTMENT OF VALVE CLEARANCE

As for Alfa 33 except for the 1.7 engine 'with hydraulic tappets which does not require any check or adjuste'ment of valve clearance

CHECKING, REPLACING AND ADJUSTING DRIVE BELTS

Alternator and water pump control belt.

As for Alfa 33 except for 1.3 - 1.5 - 1.7 engines with one carburetor where the tension value to be measured with the appropriate tool is:

78 ÷ 88 N(8 ÷ 9 kg)

Replacing timing belts with engine on car

As for Alfa 33, only for 1.7 engines the procedure for the, 33 1.7 model is to be applied

CHANGING ENGINE OIL AND REPLACING OIL FILTER

As per Alfa 33 except for the table referring to the refill capacities.which has to be modified as follows:
for 1.7 **engines**

ENGINE OIL **QUANTITY**

Capacity	l (Imp. Gal.)
Engine oil sump at max level	3.5 (0.77)
Oil filter and inner ducts	0.6 (0.13)
Periodical change (engine oil for sump and filter)	4.0 (0.88)

Before extracting the dipstick, disconnect the minimum oil level sensor wiring from the stick.

COOLING SYSTEM

Proceed as per Alfa 33 except for the table referring to antifreeze fluid composition provided in "System Refill", which has to be changed as follows. for 1.7 **engines**

Minimum outside temperature °C (°F)	-15 (+ 5)	-20 (-4)	-35 (-31)
Concentrated antifreeze Std. No. 3681-69956 l (Imp Gal)	2.2 (0.48)	2.6 (0.57)	3.65 (0.80)
Diluting drinkable water l (Imp Gal)	5.1 (1.12)	4.7 (1.03)	3.65 (0.80)
Ready-to-use antifreeze Std. No. 3681-69956 l (Imp Gal)	—	7.3 (1.61)	—

CYLINDER COMPRESSION TEST

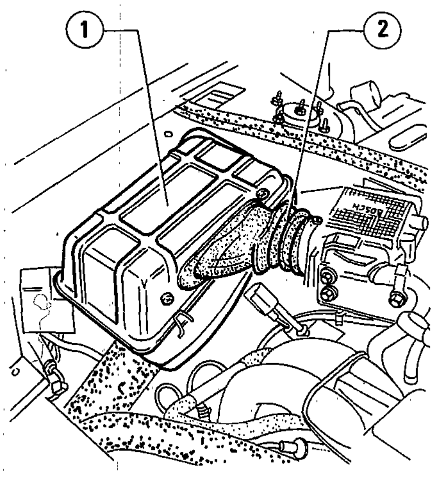
As per Alfa 33.

FUEL SYSTEM

CHECK, CLEANING AND REPLACEMENT OF AIR FILTER CARTRIDGE

As per Alfa 33 except for 1.7 electronic injection engines which require the following procedure.

1. Release clips which secure cover 1 to container.
2. Lift cover enough to remove cartridge without damaging sleeve ②.
3. Clean the cartridge thoroughly. by blowing'low pressure compressed air in the opposite direction with respect to the normal air flow.



1 Air filter cover
2 Corrugated sleeve

4. Clean the cartridge container.
5. Insert the cartridge into container positioning the protruding part downwards and hook the cover clips again.

Replace the element at the recommended intervals (see: Vehicle Maintenance Schedule).

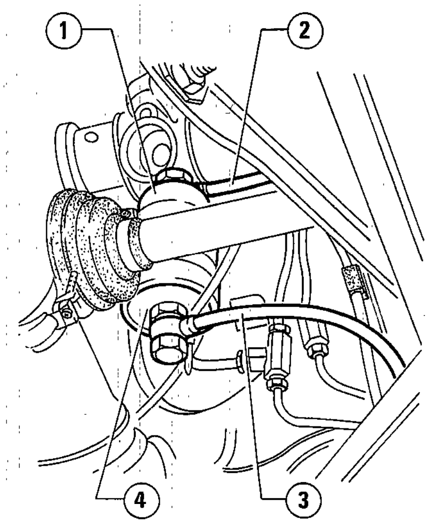
FUEL FILTER REPLACEMENT

As per Alfa 33 except for 1.7 electronic injection engines which require the following procedure.

1. Unscrew tubes ② and ③ fittings and recover the gaskets.

Properly plug fittings to prevent fuel outlet.

2. Loosen clamp ① and remove filter ④.
3. Remount the new filter in order that the arrow printed on filter body be positioned towards fuel delivery direction.
4. Complete the filter assembly operating in opposite order in respect to removal.



1 Filter support clamp
2 Fuel outlet tube
3 Fuel inlet tube
4 Fuel filter

CHECKING FUEL SUPPLY PRESSURE AND CIRCUIT TIGHTNESS

As for **Alfa 33** except for 1.7 electronic injection engines which require the following procedure

Effect checking as follows:

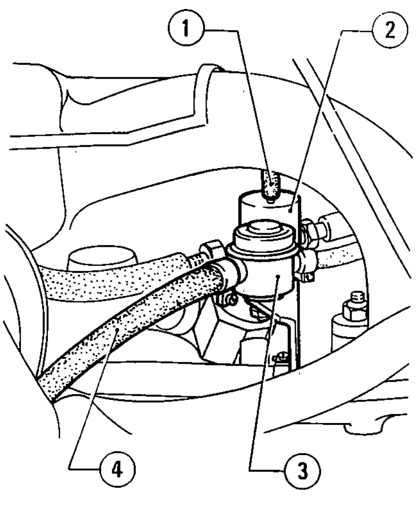
1. Circuit pressure checking

a. Disconnect fuel delivery tube ④ downstream from the damper ③

b. Connect a gauge by means of a T adaptor between damper ③ and tube ④ previously disconnected.
c. Detach tube ① from pressure gauge ②.
This is in order to avoid that any possible anomalies on idle rotation speed could cause unusual readings.
d. Start the engine; at idle speed check that fuel pressure value is:

280 ÷ 320 KPa
(2.8 ÷ 3.2 bars; 2.9 ÷ 3.3 Kg/cm²)

e. Reconnect tube ① to pressure gauge; at idle, fuel pressure should drop of 0.5 bars approximatively and then rise again when throttle valve will open. Should this occur, please check any possible tube ① depression leaks.



1 Depression tube
2 Fuel pressure gauge
3 Throb damper
4 Tube delivery to fuel distribution manifold

2. Checking on circuit tightness

a. With pressure gauge plugged, and with engine on idle, throttle the delivery tube immediately downstream from pressure gauge, detecting a pressure increase up to

400 KPa
(4 bars; 4.1 Kg/cm²)

(do not let the pressure exceed this value)

b. With pressure on 2.5 bars check that fuel delivery tubes and fittings do not show leaks.
c. If fuel pressure does not reach this value and if no leaks are detected check the filter and/or the pump ooeration.

CHECKING AND POSSIBLE ACCELERATOR CONTROL ADJUSTMENT

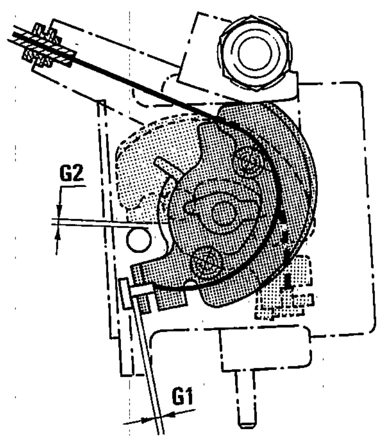
As for **Alfa 33** except for 1.7 electronic injection engines which require the following procedure

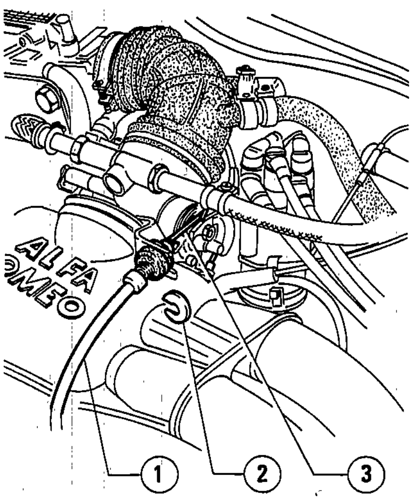
1. Check cable sliding
Checkthattheacceleratorcontrolcable slides freely in its sheath

2. Check cable clearance

a. With the accelerator pedal released, check that the accelerator pedal on control lever has an axial clearance of $G_1 = 1 \div 2$ **mm.**

b If necessary, proceed to adjust the cable clearance extracting the adjustement clip ② in order to give the prescribed clearance to the cable, and reinsert the clip in the new position.





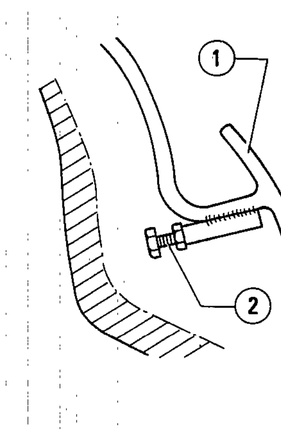
1 Accelerator cable
2 Adjustment clip
3 Accelerator cable sheath

3. Checking on maximum throttle valve opening

a. With accelerator pedal pressed as far as it will go, check that the accelerator control cam can still rotate by

. $G_2 = 1 \div 2$ mm

If necessary, proceed to adjustement by acting on stop screw (2) below the accelerator pedal.



1 Accelerator pedal
2 Stop screw

CHECKING OF EMMISSIONS

CHECK AND ADJUSTMENT OF IDLE R.P.M. AND EXHAUST EMISSIONS

Effect the following preliminary checks:

a. Cleaning and replacement of air filter cartridge.
b. Ignition system efficiency: spark plugs, cables, cap, frotary rotor (see Group 05 - transistorised ignition without contacts).
c. Ignition timing.
d. Checking of accelerator control adjustment (see Group 04 - Checking and accelerator control adjustment).

CAUTION

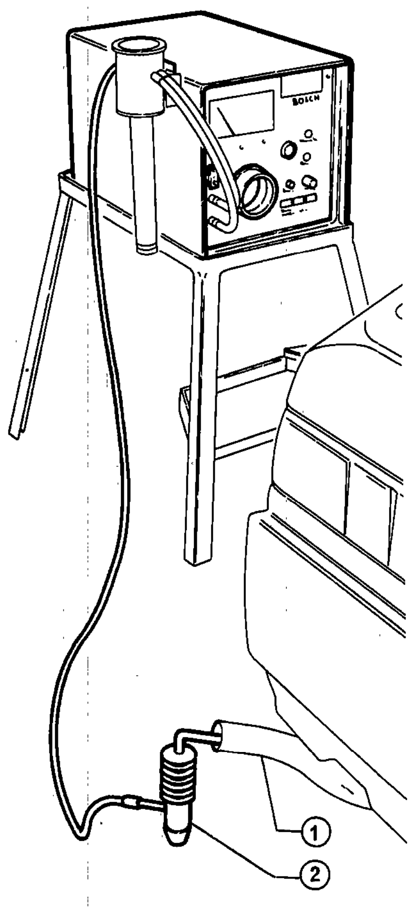
If during engine tune up there is no extra cooling fan available, keep checking the therinometer and the water temperature warning light on dashboard and immediately suspend testing if temperature' goes up, meaning that engine is overheating.

Single carburetor models

Check idle-rpm and overall CO% as follows:

1. Insert CO-tester probe (2) into the tail pipe (1).
2. Connect an electronic tachometer'to the engine.
3. Start the workshop gas exhauster.
4. Start the engine and warm it up to normal running temperature.
5. Now check that engine rpm is within specified value.

Idle-rpm
900 ÷ 1000 r.p.m.



1 Tail pipe
2 CO-tester probe

6. If not within specified value, adjust idle-rpm **just by turning relevant idle-adjusting screw (2) which makes it possible to change rpm** without changing CO percentage **(Carbon monoxide).**
7. Verify **that CO percentage picked up by tester corresponds to specified value and that engine runs smoothly.**

Allowed CO%
1·5 ÷ 1·8

If not within specified value or in case of engine tune up after engine overhauling or after having cleaned or replaced the carburetor, an adjustment involving mixture metering screw (1) and throttle valve screw (3) is requised. In this instance, proceed as follows:

(1) Remove seals from mixture metering screw (1) and from throttle valve screw (3).

(2) Tighten idling screw (2) all the way.

(3) Now act on throttle valve screw (3) and on mixture metering screw (1) till following conditions are present:

Rpm
750 ÷ 800
C O %
0.5 ÷ 1% total

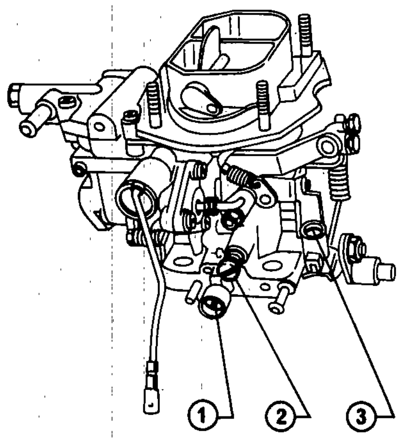
(4) Loosen idling adjusting screw (2) till a 900 ÷ 1000 rpm idling speed is reached.

(5) Act on mixture metering screw (1) till the smoothest possible engine running is obtained, while keeping CO% within the prescribed values.

% CO 0,5 ÷ 1

(6) Fit back into place mixture metering and throttle valve screw seals.

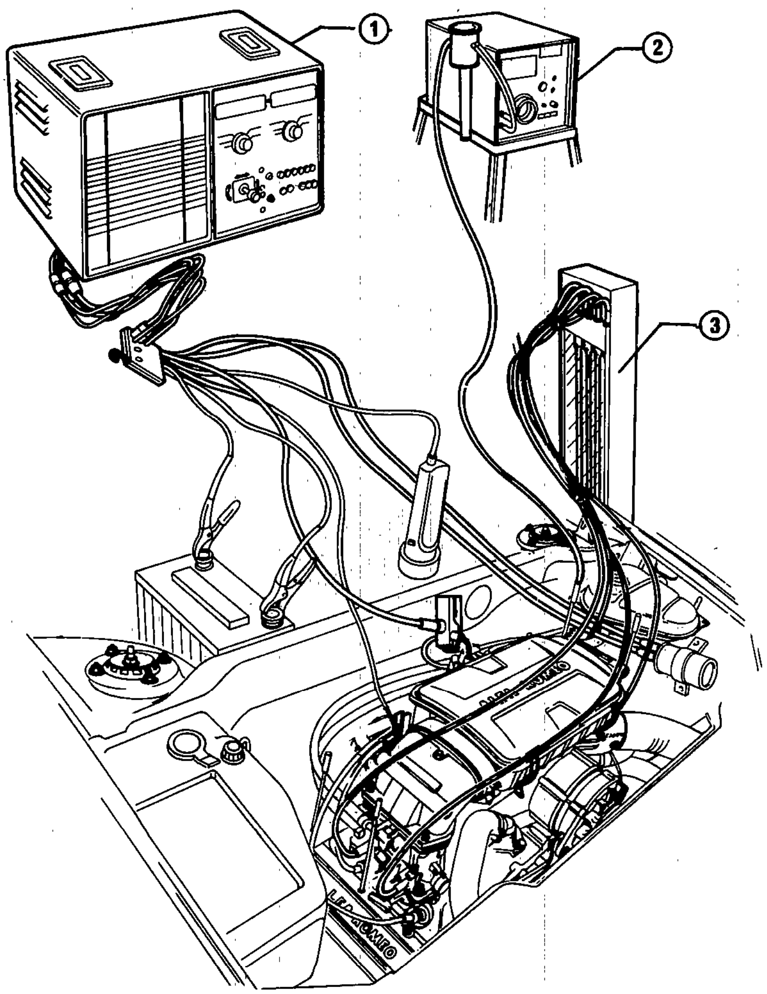
(7) If further optimizing of idle-rpm is desired, just act on relevant idling adjusting screw (2).



1 Idling mixture metering screw
2 Idling adjusting screw
3 Throttle valve adjusting screw

***Double carburetor** models*

Check idling-rpm, CO% on each cylinder and line-up of carburetor throttle valves as follows:
Before beginning this test check accelerator cable adjustment (Refer to: Group 04 - Accelerator Cable Adjustment)



1. Insert the tube of the mercury vacuometer in the appropriate fittings.
2. Start the engine and run it to normal running temperature so that the temperature is equal to or greater than 45°C.
3 With the gear shift in neutral, open the mercury vacuometer valve and check that the Δp values of the manometers fall within 40mm Hg. Correct any differences between left and right carburetors by acting on the throttle valve screws. Should there be misalignment (40 mm Hg) between cylinders of the same carburetor then it will be necessary to replace the carburetor.
4. Make sure that all cylinders are functioning correctly by grounding one spark plug at a time and checking that the increase in r.p.m. is identical for each cylinder.

1 Electronic rev counter
2 CO tester

If necessary act on the mixture metering screw of the out-of-tune cylinder until correct functioning is obtained.
5. Adjust the engine speed to 850 - 1000 r.p.m. by acting on the throttle valve screws, checking that the manometer readings fall within the specified values.
6. Using the CO% tester, check that the exhaust CO emissions are 1.5 - 2.5%.

To obtain better CO exhaust emission adjustment it is necessary to operate measuring the values cylinder by cylinder using special service tool C, 3.0054 connected as follows:

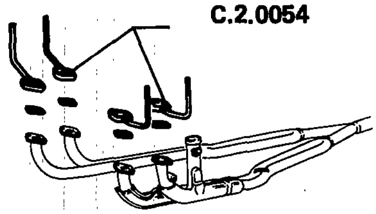
1 A. Raise car on lift and disconnect exhaust manifold from cylinder heads.

2 A. Now fit small flanges C.2.0054 with relevant gaskets and pipes for collection, of exhaust fumes - between each exhaust manifold flange and relevant fitting on cylinder heads.

3 A. Connect exhaust manifold back to cylinder heads.

The other ends of the four collection pipes emerge in the engine compartment and, being equipped with suitable plugs, are set up to test each cylinddr CO%.

C.2.0054



7. Check the idle r.p.m. and if necessary adjust it again repeating the operations described at step 5.
8. Re-set the play in the idle levers to 1 mm by tightening the stop screws and then check that the carburetors open simultaneously by acting on the point where the accelerator cable is attached, effecting short sharp spurts of acceleration (1200 - 1300 r.p.m.). Adjust the stop screws further to obtain Perfect synchronisation of the carburetors.
9. Close the vacuometer valves and remove the tubing from the fittings.

Check idle r.p.m.

The procedure is valid for 1.7 electronic injection engines with or without catalytic convertor.

1. Connect the engine to a rev counter.
2. Connect an exhauster to the exhaust tail-pipe.
3. Start the engine and run it to normal running temperature (Engine oil temperature 75-80°C).
4. With the gears in neutral and the ancillary devices cut out check that the engine r.p.m. falls within the specified values.

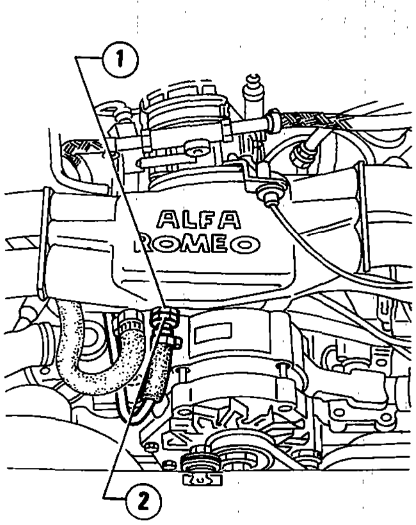
For 1.7 electronic injection engines with catalytic convertor.

idle r.p.m. 950^{+100}_{-50}

For 1.7 electronic injection engines

idle r.p.m. 800 - 900

5. If the idle r.p.m. does not fall within these values, adjust by operating as follows:
(a) Loosen the locknut ① and turn the screw ② until the correct r.p.m. is obtained.
(b) Lock the locknut ①



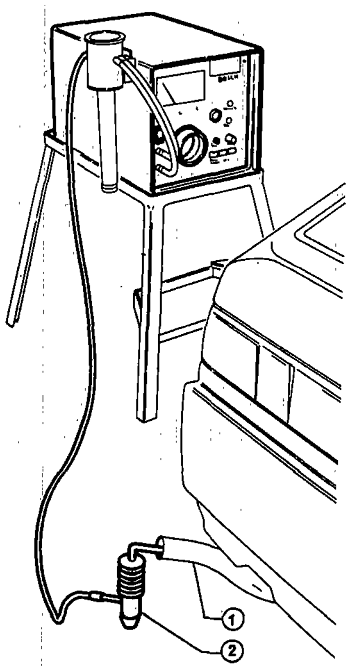
1 Locknut
2 Idle r.p.m. adjusting screw

Check exhaust emission

Procedure is applicable to 1.7 electronic injection engines without catalytic convertor only.
After adjustment of the idle r.p.m. following the above described procedure, proceed to the check and adjustment (if necessary) of the exhaust emissions by operating as follows.

1. Switch on the gas exhauster, start the engine and run it to normal running temperature.
2. With engine on idle and using a suitable exhaust gas tester, check that the percentage of CO and the quantity of hydrocarbons are less than the specified values.

Admissible CO% 0.8 - 1.7



1 Exhaust tail-pipe
2 Probe of exhaust tester

3. Should the CO% be above the admissile limit it will be necessary to act on the appropriate screw positioned in the debimeter.
4. It will then be necessary to check that idle r.p.m. falls within the specified values 850 ± 50 r.p.m. and if it does not the "Idle r.p.m. Check" will have to be repeated.

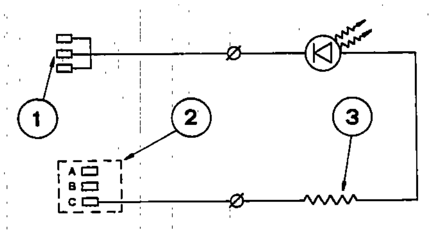
Check of exhaust emissions

The procedure is valid for **1.7 electronic injection engines with catalytic convertor.**

After adjustment of the idle r.p.m. following the' above described procedure, proceed to the check and adjustment (if necessary) of the exhaust emissions by operating as follows.

This semplified procedure is for use with engines equipped with FIAT TESTER type wiring.

'Use wiring instrument No. C. 90034 illustrated in thecircuitdiagram below:

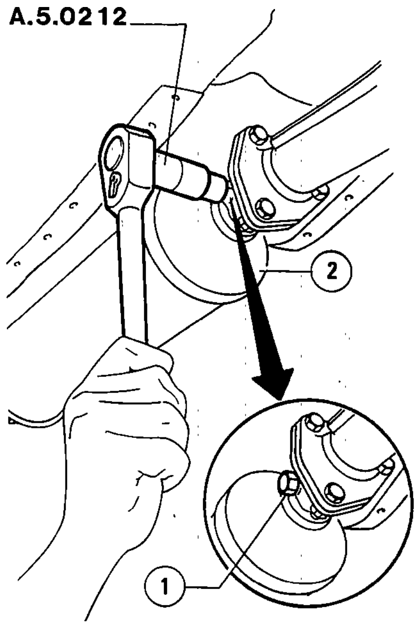


3 WAY CONNECTOR FOR MIN AND MAX SWITCH
470 OHMS 1/2 W
3 WAY CONNECTOR FIAT TESTER PIN C

1. Warm up engine
2. Remove min. and max switches wiring side connector and the 3 way connector Of the instrument.
4. Insert the cormector of the instrument in the 3 way trouble diagnosis connector.
5. Check the state of the LED diode and proceed to adjust the screw of the potentiometer located in the plugged seating. The correct setting is obtained when the ~"ON" time of the flashing LED is equal to the "OFF' time. When this setting h'as been obtained replug the seating of the "CO" screw.

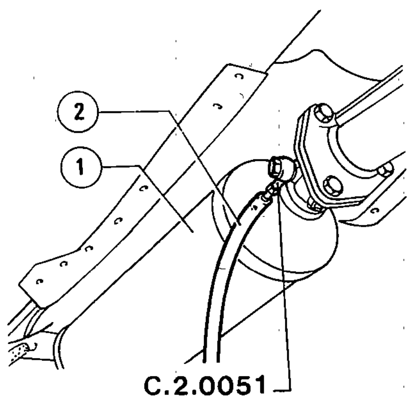
As an alternative to the above procedure, operate as follows.

1. Disconnect the' wiring of the Lambda sensor.
2. Using the spanner **A-5.021 2,** unscrew the plug (1) located at the inlet of the catalytic silencer box (2)



1. Plug for sampling exhaust gas
2. Catalytic silencer box

3. Fit the tool **C.2.0051** on thefitting for sampling exhaust gases and connect it with tube (2) to the exhaust gas tester



2 Catalytic silencer box
2 Tube connected to exhaust gas tester

4 Start the engine and check that with the engine running on idle the CO% and the quantity of unburned hydrocarbons are less than the specified values.

When the engine is in its normal running state and the lambda probe is disconnected, the value corresponding
to the total emissions before the catalytic exhaust head shall be included in the range'mentioned below.

volume % CO: 0.8 (min) to 1.5 (max)

5. Should the CO% not fall within the specified values, it will be necessary to act on the adjusment screw located in the debimeter in the plugged seating. It will then be necessary to check that the idle r.p.m. falls within the specified values of 900-1050 r.p.m. and if it does ndt to follow the procedure described at the previous step. Once the setting has been effected, re-plugg the seating with the apropriate seal and reconnect the lambda sensor.

CHECK AND ADJUSTMENT OF THE IDLE R.P.M.

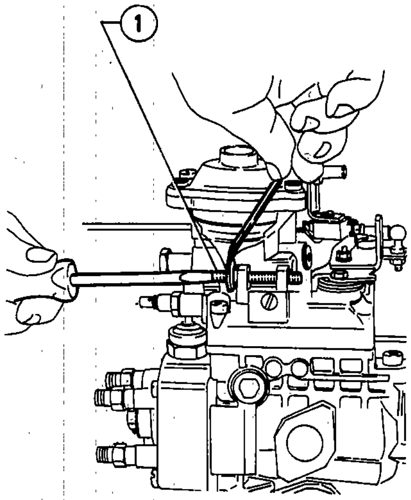
'For 33 1.8 TD only

Carry out the adjustment of the idle r.p.m. with the engine warmed up, the gears in neutral and all ancillary devices cut out, operating as follows.

Unlock 'the locknut and turn the adjusting screw ① until the specified value

920 ÷ 960 r.p.m.

is encountered.



1 Adjusting screw

CATALYTIC MUFFLER REPLACEMENT

This procedure is for electronic injection 1.7 engines with catalytic muffler only.

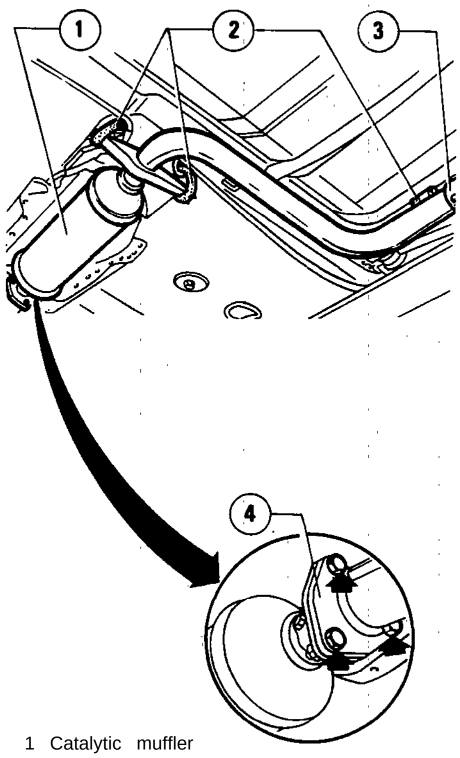
When Km stated on "Chart of Vehicle Mainten:ance' Operations" are coverecl, please proceed to replace catalytic muffler as follows:

1. Put the vehicle on auto lift.

2. Loosen clamp ③ bolt.

3. Unscrew the three bolts on flange ④ contiecting catalytic muffler and exhaust manifolds.

4. Unscrew catalytic muffler ① from split rings ② and remove it disengaging it from rear track of exhaust pipe.~



1 Catalytic muffler
2 Supporting split ring
3. Clamp
4. Flange connecting catalytic muffler - exhaust manifold

5. Install a new catalytic muffler working with opposite order in respect to removal, fitting a new gasket on flange connecting exhaust manifold.

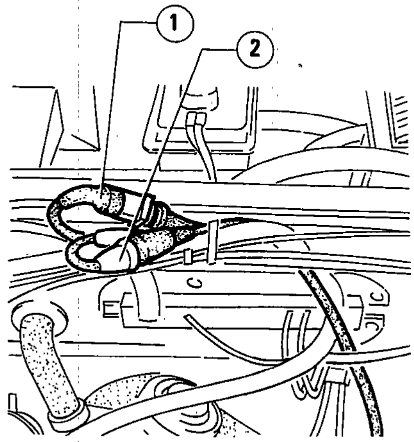
6. Check that, with the engine running, there are no leaks from pipe connections and that the exhaust system is not unusually noisy

LAMBDA PROBE REPLACEMENT

This procedure is valid for electronic injection 1.7 engines with catalytic convertor only.

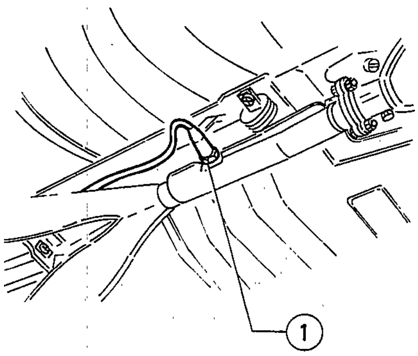
At km stated on "Chart of vehicle Maintenance Operations" replace lambda probe as follows:

1. Put the vehicle on auto lift.
2. Working from engine room, disconnect connectors ① and ② of lambda probe and disengage wiring from clips.



1 Lambda probe resistance connector
2 Lambda probe signal connector

3 Working from below the vehicle, unscrew Lambda probe ① and remove it.



1 Lambda probe

4. On installation, spread the probe body thread with grease R. Gori Never Seez or Bosch 5.964.080.1005 and tighten it fully
5. Reconnectthewiringofthelambda probe.

CHECK ON AIR SUPPLY SISTEM TIGHTNESS DOWNSTREAM FROM THE AIR FLOW SENSOR

This procedure is for electronic injection 1.7 engines with catalytic convertor only.

Make sure that all pipe fixing clamps are fully tightened

Start engine at idle r.p.m., then manually deform pipings and sleeve downstream from the air flow sensor Should there be any faulty pipes with air inlets to 'engine undetected by sensor, some variations of idle r.p.m. will take place

To ease the location of any possible leaks in the air supply system, spread some suds on involved pipes.

TROUBLESHOOTING PROCED~URE TO CHECK FUEL SUPPLY SYSTEM TIGHTNESS

This procedure is valid for **electronic injection 1.7 engines with catalytic convertor only.**

This procedure is to be effected when reaching the km stated on "Chart of Vehicle Maintenance Operations",and if the following symptoms occur:

— Petroli smell.

— Visual signs of leaks from system fittings and connections.

— Effect the procedure stated in paragraph "Fuel Engine - Check on Fuel Supply Pressure and Circuit Tightness" - steps 1. and 2.. completing it with what follows:

a. Make sure that fire-fighting applicances are available in order tobe able to operate safely.

b. Warm engine up to normal running speed.

c. Disconnect ignition.

d. Effect a visual check. of fuel system components and fittings in order to locate leak origin.

e. Check the whole system (connecting pipes, fittings, components) using a gas detector.

f. Close to leak area, one will note a tester pointer reaction.

This test with tester must be effected slowly in order to compensate for the time delay of tester response.

g. Following leak location, follow procedure steps d. and/or e. then eliminatethe leak replacing faulty components or properly tightening loosened clamps.

h. On completion of operation, start the engine letting it idle run for few minutes and then switch ignition off.

i. Repeat test as per steps c. and d. to check that diagnosis is correct and repair is efficient.

l. At end of whole procedure, road test for *about* 30 minutes and then make a final test to be sure of system integrity.

TROUBLESHQOTING PROCEDURE TO CHECK FUEL VAPOUR EMISSIONS CHECKING SYSTEM TIGHTNESS

Possible causes could be:

— Leaks of vapour from system components, accessories and connections.

a. Disconnect pipe (8) from dump valve (9)
Connect a compressed air source to the end of pipe (8) with a gauge connected.

b. Pressurize the system with compressed air to reach a pressure of.

2.49 KPa (0.025 bars;
0.0255 Kg/cm^2; 254 mm H_2O)

and then close the connection. If one can't (reach the specified value, open the compressed air supply system and check the system tightness (with gas deteetor).

c. Measure pressure drop in system (it must not exceed

0.125 KPa (0.00125 bars;
0.0127 Kg/cm^2; 12.7 mm H_2O

in' 10 minutes).

d. If within 10 minutes the pressure drop exceéds this value, locate leak spreading pipes with suds or using gas detector.

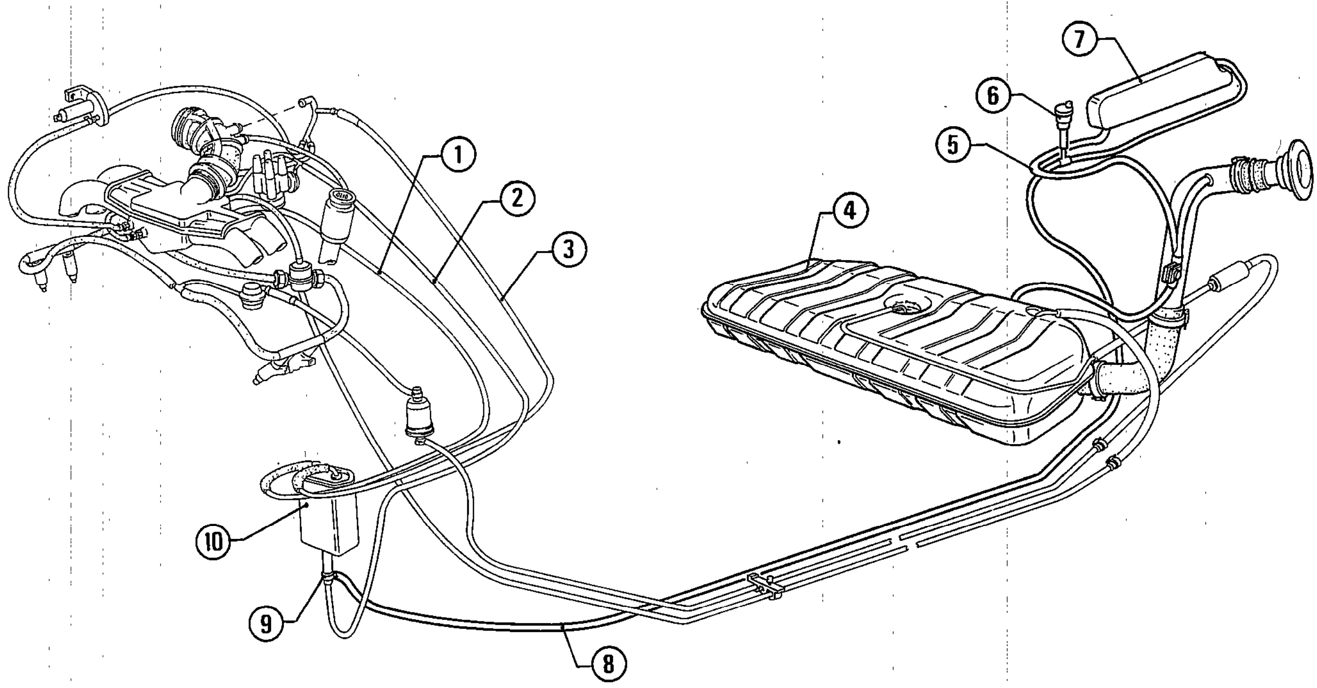
e. When there are leaks, some soap bubbles will appear.

f. Should the leak corne from fuelcap filling union area, first replace the cap. If after replacing cap, tightness is restored, this means that cap was faulty, otherwise replace the union.

g. Replace faulty components or tighten loosened clamps.

h. Repeat procedure b. and c. to check diagnosis efficiency.

l. If after effecting the above mentioned process, leaks still exist, effect diagnostic procedure to check the supply system tightness of fuel injection system.



1 Fuel vapour suction pipe
2 Decompression pipe for dump valve control
3 Air delivery pipe
4 Fuel tank
5 Fuel vapour exhaust pipe
6 Compensation valve
7 Fuel vapour separator
8 Fuel vapour recovery pipe
9 Dump valve
10 Fuel vapour filter.

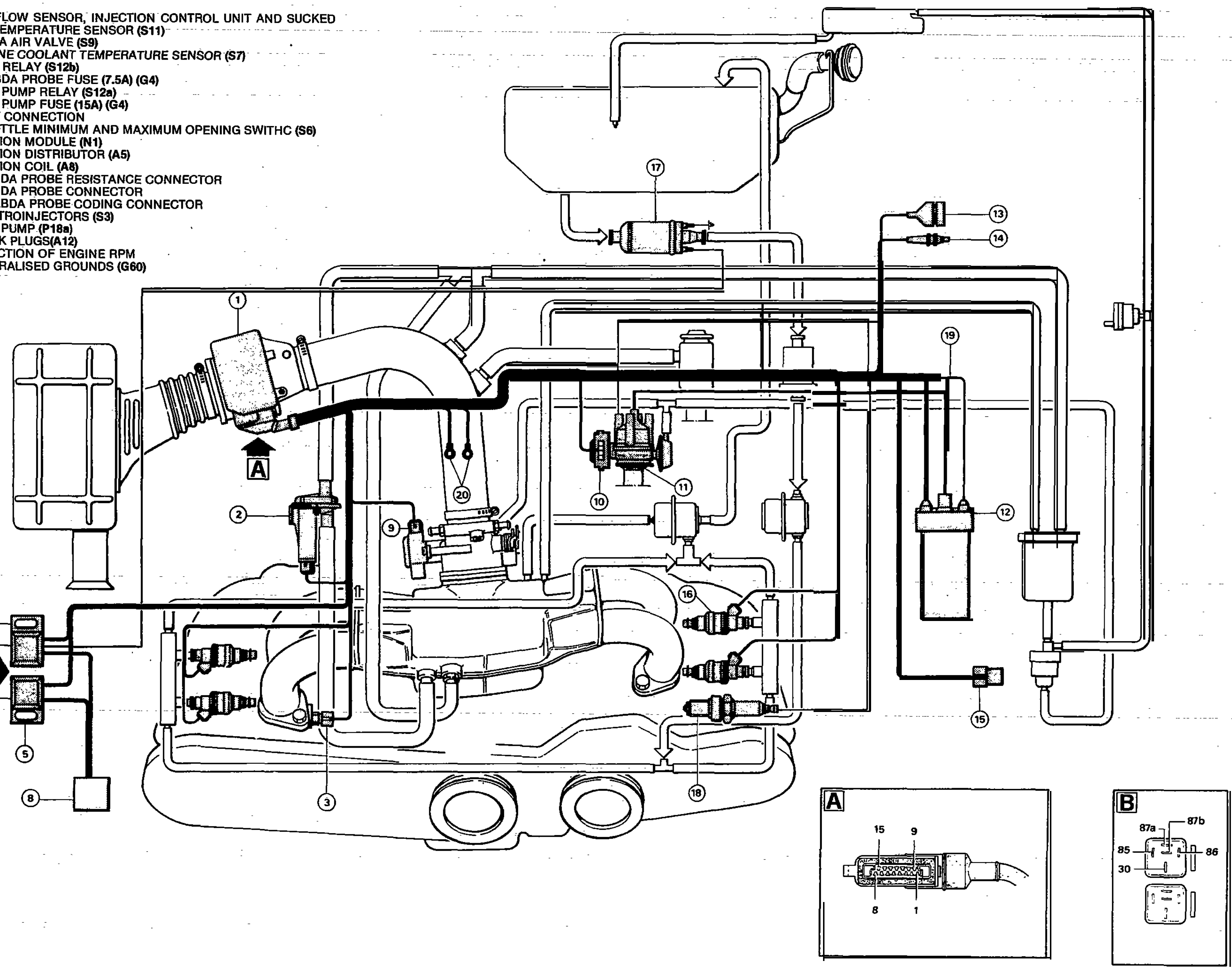
DIAGNOSTIC AND CORRECTIVE INTERVENTIONS ON LE3.2 JETRONIC INJECTION SYSTEM

Procedures and diagrams

for electronic injection 1.7 engines with catalytic converter only

WIRING DIAGRAM OF INJECTION SYSTEM

1 AIR FLOW SENSOR, INJECTION CONTROL UNIT AND SUCKED AIR TEMPERATURE SENSOR (S11)
2 EXTRA AIR VALVE (S9)
3 ENGINE COOLANT TEMPERATURE SENSOR (S7)
4 MAIN RELAY (S12b)
5 LAMBDA PROBE FUSE (7.5A) (G4)
6 FUEL PUMP RELAY (S12a)
7 FUEL PUMP FUSE (15A) (G4)
8 BODY CONNECTION
9 THROTTLE MINIMUM AND MAXIMUM OPENING SWITHC (S6)
10 IGNITION MODULE (N1)
11 IGNITION DISTRIBUTOR (A5)
12 IGNITION COIL (A8)
13 LAMBDA PROBE RESISTANCE CONNECTOR
14 LAMBDA PROBE CONNECTOR
15 LAMABDA PROBE CODING CONNECTOR
16 ELECTROINJECTORS (S3)
17 FUEL PUMP (P18a)
18 SPARK PLUGS(A12)
19 DETECTION OF ENGINE RPM
20 CENTRALISED GROUNDS (G60)



THE ENGINE DOES NOT START

During a start attempt, check the correct fuel system pressure (from 2.8 bars to 3.2 bars).

NO → Effect an electronic and functional test of fuel pump.

YES ↓

Check the presence of voltage to spark plugs

NO → Check ignition system: integrity of ignition distributor, spark plugs and associated cables.

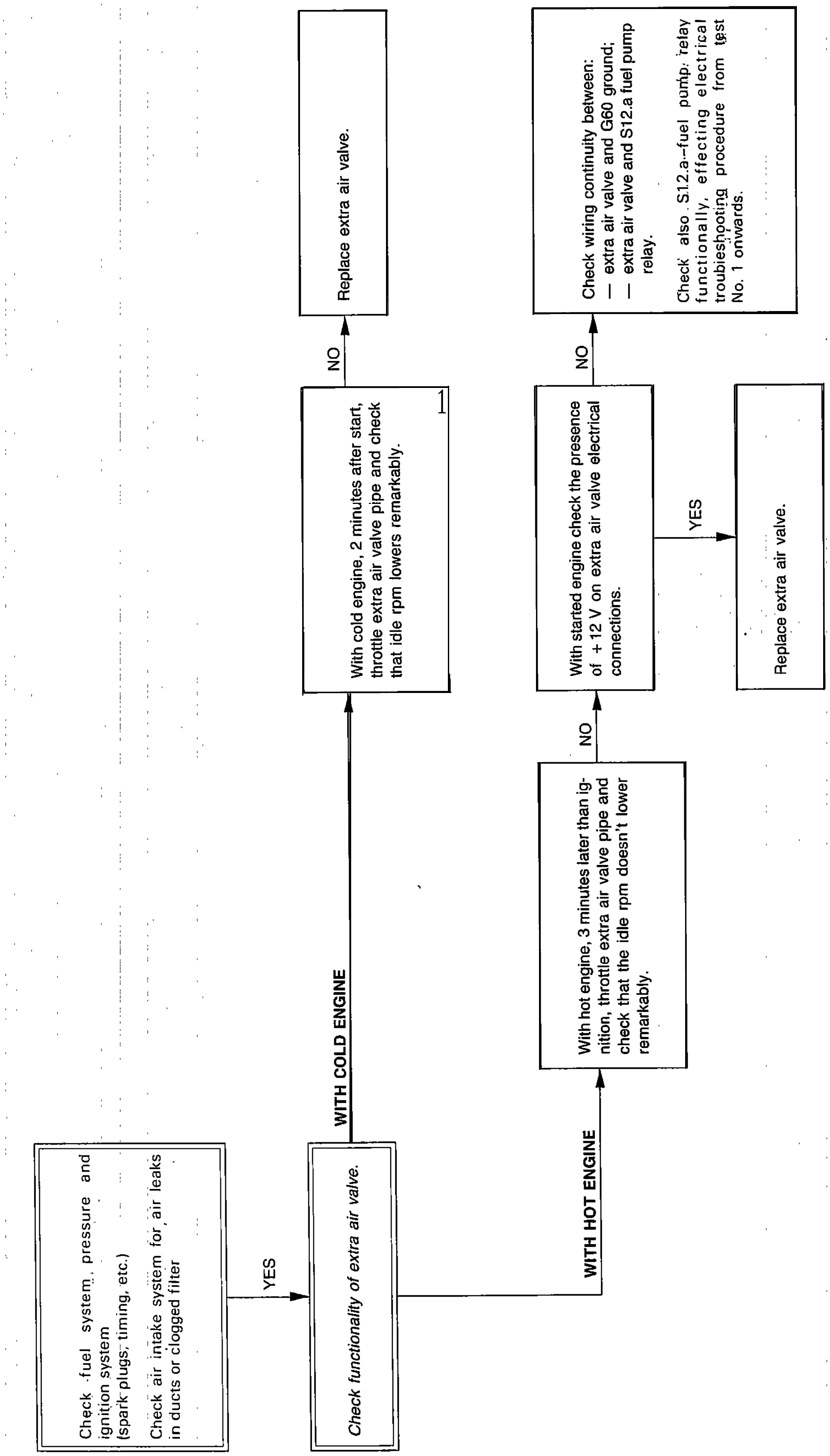
YES ↓

Check the efficiency of intake, ducts, filter air flow sensor, throttle body.

YES ↓

Effect troubleshooting procedure from test No. 1 onwards.

THE ENGINE STARTS WITH DIFFICULTY



IRREGULAR IDLE RPM

Check for correct air flow through throttle body

Check that on a sucking ducts don't exist any leaks and that the air filter is not clogged

YES

Effect electrical troubleshooting from test No. 1 onwards.

ANOMALIES IN ACCELERATION AND BURSTS IN RELEASING

Check correct fuel system pressure and ignition system efficiency (spark plugs, timing, etc.).

Check that no leaks do exist in air intake ducts

YES

Check G60 ground efficiency.

YES

Check minimum & maximum opening throttle switch efficiency by effecting test No. 4 of electrical troubleshooting.

EXCESSIVE FUEL CONSUMPTION

Check correct functionality of the engine water temperature sensor and relevant wiring by effecting test No. 5 of electrical troubleshooting.

YES

Check injectors tight.

YES

Check valve clearance or engine timing.

UNCORRECT DISCHARGE EMISSIONS

Check functionality of Lambda probe by effecting electrical troubleshooting procedure.

YES

Connect a CO-tester upstream, from the catalyst disconnect Lambda probe and verify a CO value increase.

Reconnect Lambda probe and check a CO value lowering.

NO → Replace electronic unit.

YES

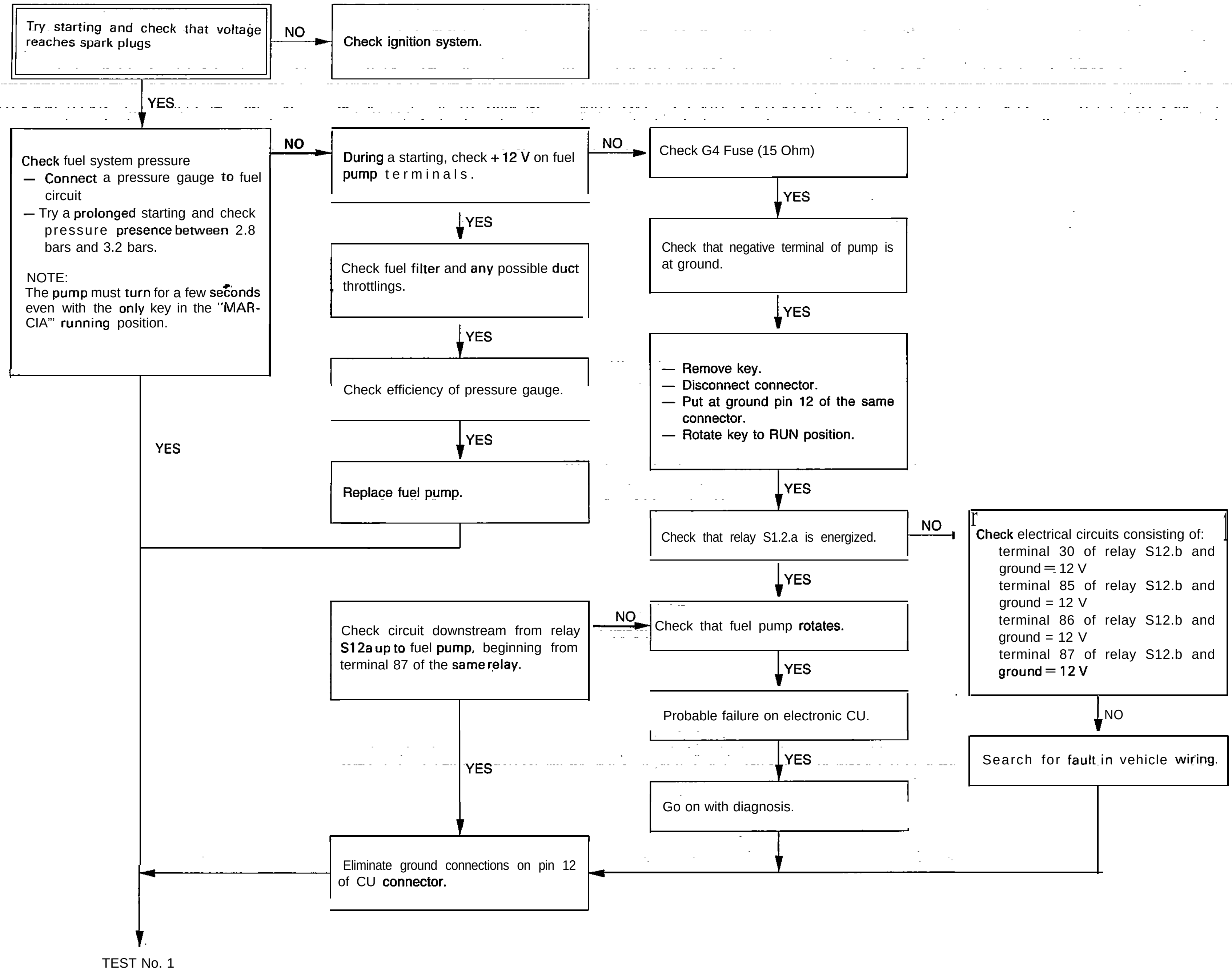
Check valve clearance, air supply system for leaks in air intake ducts.

Check catalyst muffler.

‘ELECTRICAL TROUBLESHOOTING PROCEDURE

for electronic injection 1.7 engines with catalytic convertor

NOTE:
THIS TROUBLESHOOTING MAINLY DEALS WITH THE ELECTRICAL/ELECTRONIC DIAGNOSIS OF SYSTEM AND SENSORS AND ACTUATORS ASSOCIATED TO IT.
IF AT THE END OFTESTTHEANOMALY SHOULD REMAIN, IT WILL BE NECESSARY TO CHECK MAIN MECHANICAL DEVICES SUCH AS. VALVES, CYLINDERS, COUPLINGS TIGHTNESS OF AIR INTAKE DUCTS, ETC.


Try starting and check that voltage reaches spark plugs
NO
Check ignition system.
YES
Check fuel system pressure
— Connect a pressure gauge to fuel circuit
— Try a prolonged starting and check pressure presence between 2.8 bars and 3.2 bars.
NOTE:
The pump must turn for a few seconds even with the only key in the "MARCIA" running position.
NO
During a starting, check + 12 V on fuel pump terminals.
YES
Check fuel filter and any possible duct throttlings.
YES
Check efficiency of pressure gauge.
YES
Replace fuel pump.
NO
Check G4 Fuse (15 Ohm)
YES
Check that negative terminal of pump is at ground.
YES
— Remove key.
— Disconnect connector.
— Put at ground pin 12 of the same connector.
— Rotate key to RUN position.
YES
Check that relay S1.2.a is energized.
NO
Check electrical circuits consisting of:
terminal 30 of relay S12.b and ground = 12 V
terminal 85 of relay S12.b and ground = 12 V
terminal 86 of relay S12.b and ground = 12 V
terminal 87 of relay S12.b and ground = 12 V
NO
Search for fault in vehicle wiring.
YES
Check that fuel pump rotates.
NO
Check circuit downstream from relay S12a up to fuel pump, beginning from terminal 87 of the same relay.
YES
Probable failure on electronic CU.
YES
Go on with diagnosis.
YES
Eliminate ground connections on pin 12 of CU connector.
YES
TEST No. 1

TEST No. 2 - CHECKINGS ON GROUNDS (PIN 4 AND 5 OF CU)

- *Set multimeter to 200 Ohm F.S.*
- *Key removed.*
- *Disconnect CU connector.*

YES

Check continuity between:
- **pin, 4 of CU connector and G60 ground;**
- **pin 5 of CU connector and G60 ground.**

NO → Restore wiring between:
- pin 4 of CU connector and G60 ground;
- pin 5 of CU connector and G60 ground.

Check also G60 grounds functionality.

YES

TEST No. 3 - CHECK CONNECTION TO RPM SIGNAL (CU PIN 1)

- Set multimeter to 200 Ohm F.S.
- Key removed
- Electronic CU connector disconnected.

YES

Check wiring continuity between pin 1 of CU connector and terminal 1 of ignition coil.

NO → **Restore wiring.**

(ES

TEST No. 4

TEST No. 4 - CHECK ON MIN. & MAX. OPENING THROTTLE SWITCH (CU PIN 15 AND 14)

- *Set multimeter to 200 Ohm F.S.*
- *Key removed.*
- *Disconnect electronic CU connector.*

YES

Insert multimeter probes between CU connector pin 15 and ground.

Check the existance of a resistance value lower than 10 Ohm.
Press accelerator and check an infinite resistance value.

NO → Check setting and efficiency of minimum opening switch.

YES

Check wiring continuity between:
— black wire on S6 switch connection and ground;
— white wire on S6 switch connection and CU connector pin 15.

NO → Restore wiring.

YES

Insert multimeter probes between connector pin 14 and ground.

Check the presence of an infinite resistance value.
Fully depress the accelerator and check a resistance value lower than 10 Ohm

NO → Check setting and efficiency of maximum opening switch.

YES

Check wiring continuity between yellow wire on S6 switch connection and CU connector pin 14.

NO → Restore wiring.

ES

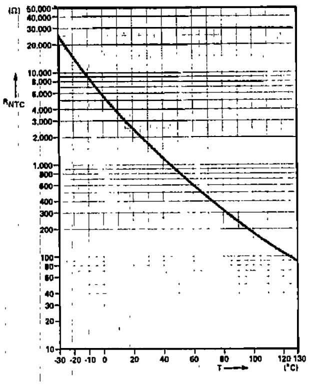
TEST No. 5

TEST No. 5 - CHECK ON ENGINE WATER TEMPERATURE SENSOR (CU PIN 8)

- *Set multimeter to 20 KOhm F.S.*
- *Key removed.*
- *Disconnect electronic CU connector.*

↓

Check between pin 6 of CU connector and ground. a resistance value depending on engine water temperature as per curve.



NO → Check wiring continuity between:
— electronic CU connector pin 6 and brown wire on S7 temperature sensor;
— G60 ground and black wire on S7 sensor connection.

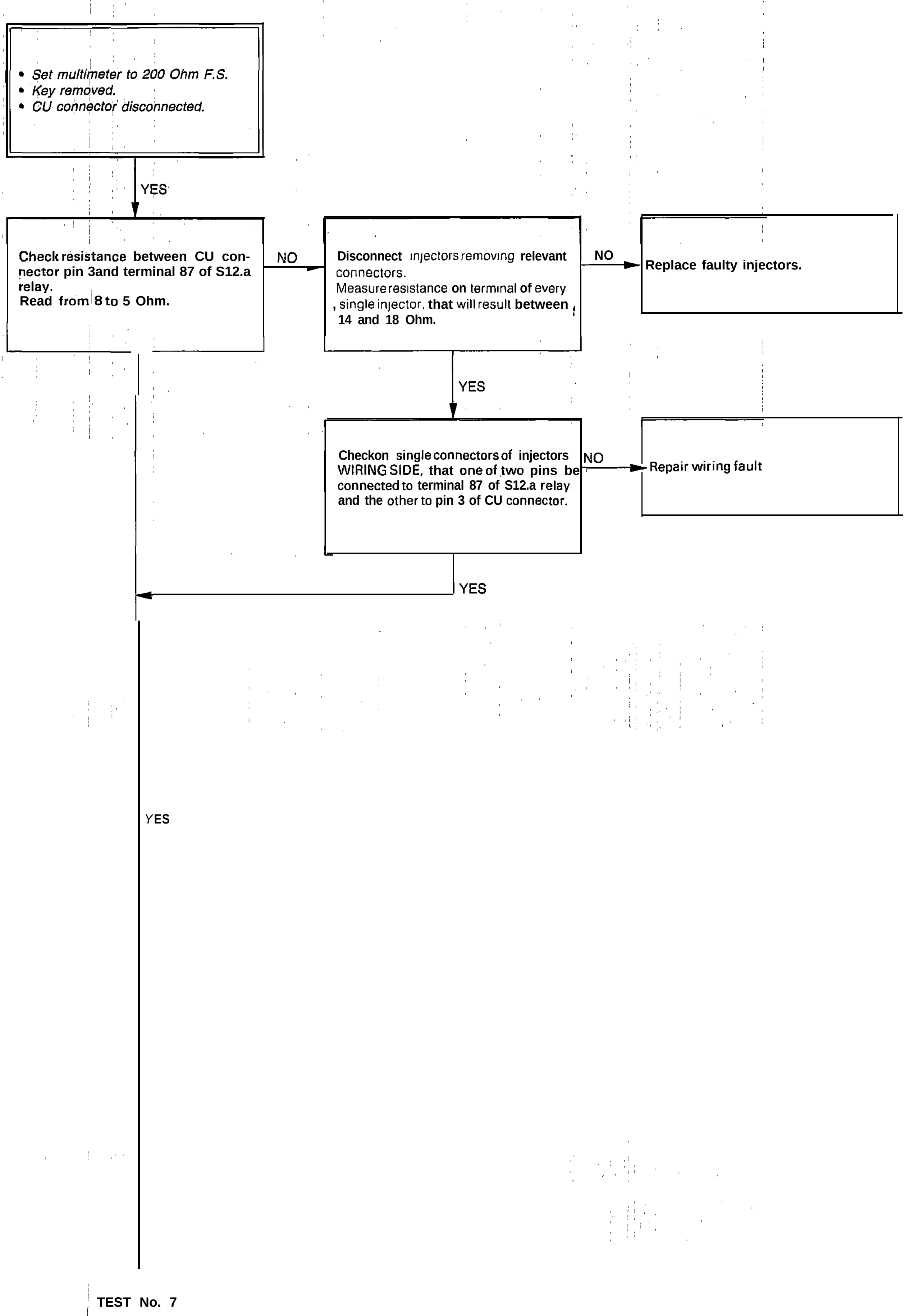
NO → Restore wiring.

YES → Replace S7 sensor

YES ↓

TEST No. 6

TEST No! 6 - INJECTOR SYSTEM CHECKING



TEST No. 7 - CHECK ON + 12 V PIN 2 AND PIN 7 OF CU

- - Set multimeter to 20 V F.S.
- Electronic CU connector disconnected.

With ignition key on RUN position, check presence of + 12 V between connector pin 2 and ground.

NO → Check integrity of fuse No. 2.
With ignition key in RUN position check presence of + 12 V between S12.b main relay shoe terminal 30 and ground.

- NO → Restore wiring between S12.b relay shoe terminal 30 and CU connector pin 2.
- YES → Check presence of + 12 V between terminal 86 and S12.b relay shoe terminal 87.
  - NO → **Check wiring continuity between S12.b relay shoe terminal 85, and ground G60. If necessary restore wiring.**
    - YES → With ignition key in RUN position, check presence of + 12 V on G67 connection pin 2. If necessary, restons wiring.
      - NO → Check vehicle wiring (e.g. wiring between G67 connection and G99a connection, between G99a connection and G1 fuse holder box, integrity of fuse No. 7 and relevant supply from starting block.
  - YES → Check presence of + 12 V between 512.6 relay shoe terminal 87 and ground.
    - YES → Replace S12 relay.
    - NO → Check presence of + 12 V between:
      — G67 connection pin 3 and ground.
      — G67 connection pin 4 and ground.
      If necessary restore wiring.
      - NO → Check vehicle wiring between positive battery and pin 3 and 4 on G67 connection

YES ↓

With ignition key in RUN position check presence of + 12 V between CU connector pin 7 and ground.

- NO → **Restore wiring between pins 2 and 7 of ECU connector.**
- YES → TEST No. 8

TEST No. 8 - CHECK ON LAMBDA PROBE (CU PIN 13)

- *Connect wiring side connector to CU.*
- *Set multimeter to 20 V F.S.*
- *Start engine.*

↓

With started engine check the presence of 12 V on preheating resistance terminals of Lambda probe.

→ NO: Check G4 (7.5 A) fuse integrity.

→ NO: — Restore wiring relative to heating resistance

↓ YES

— Disconnect resistance preheating connector of Lambda probe.
— Set multimeter to 200 Ohm FS.
— Check heating resistance functionality measuring a value between 3 Ohm and 20 Ohm.

→ NO: Replace Lambda probe group.

↓ YES

— Set multimeter to 2 V F.S.
— Take out cap from Lambda probe connactor (wiring side).
— With vehicle warmed up and running check between connection point of Lambda probe and ground for a voltage value between 30 mV and 1 mV.

→ NO: Replace Lambda probe.

↓ YES

— key removed.
— Disconnect CU connector.
— Check continuity between wiring side connector pin 13 and lambda probe connection point.

→ NO: Restore wiring.

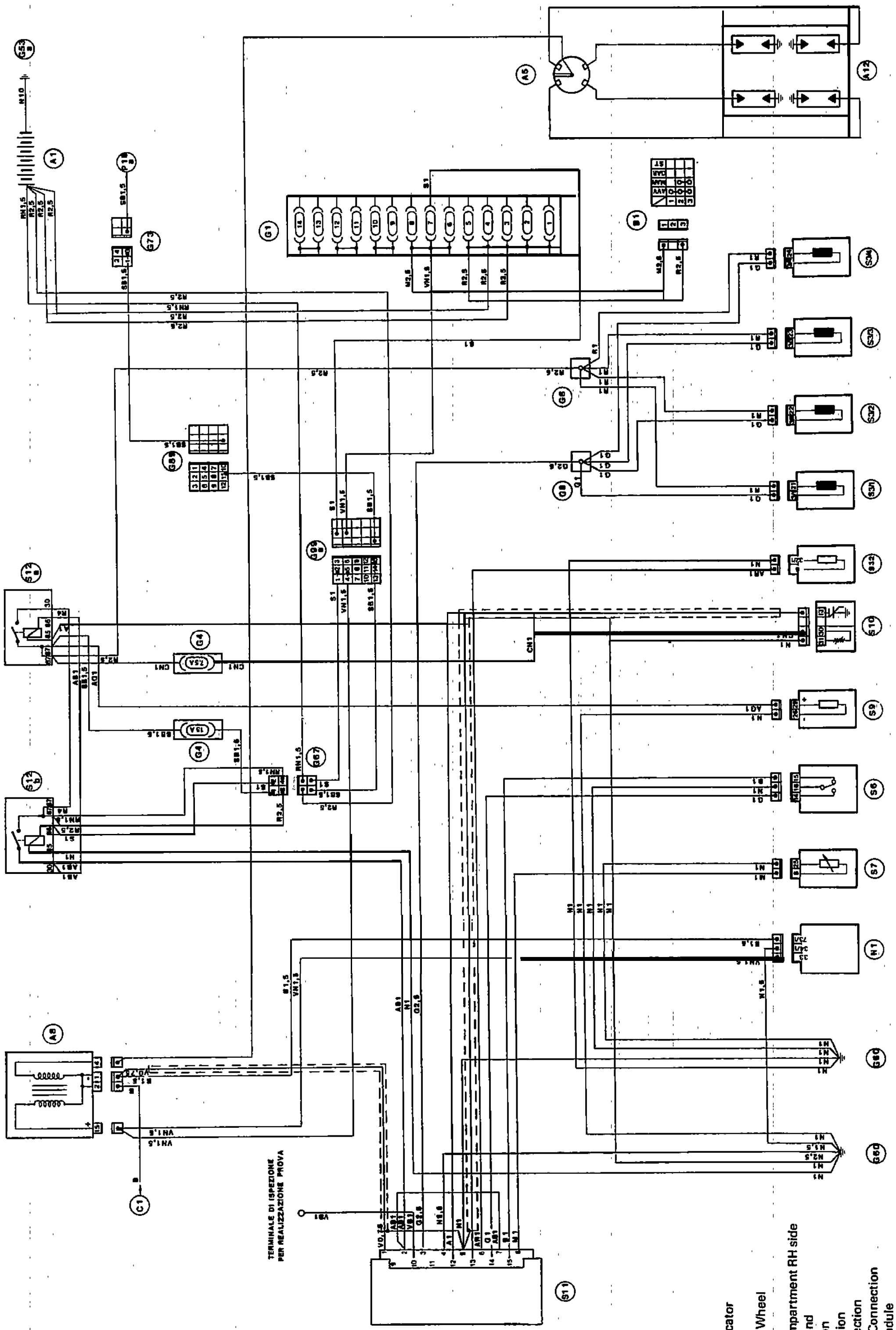
END OF ELECTRIC/ELECTRONIC TROUBLESHOOTING

If test tesults were positive, but fault still remains, try replacing in the order:

— CU.
— Air flow sensor.

INJECTION - IGNITION WIRING DIAGRAM

for electronic injection 1.7 engines with catalytic convertor only



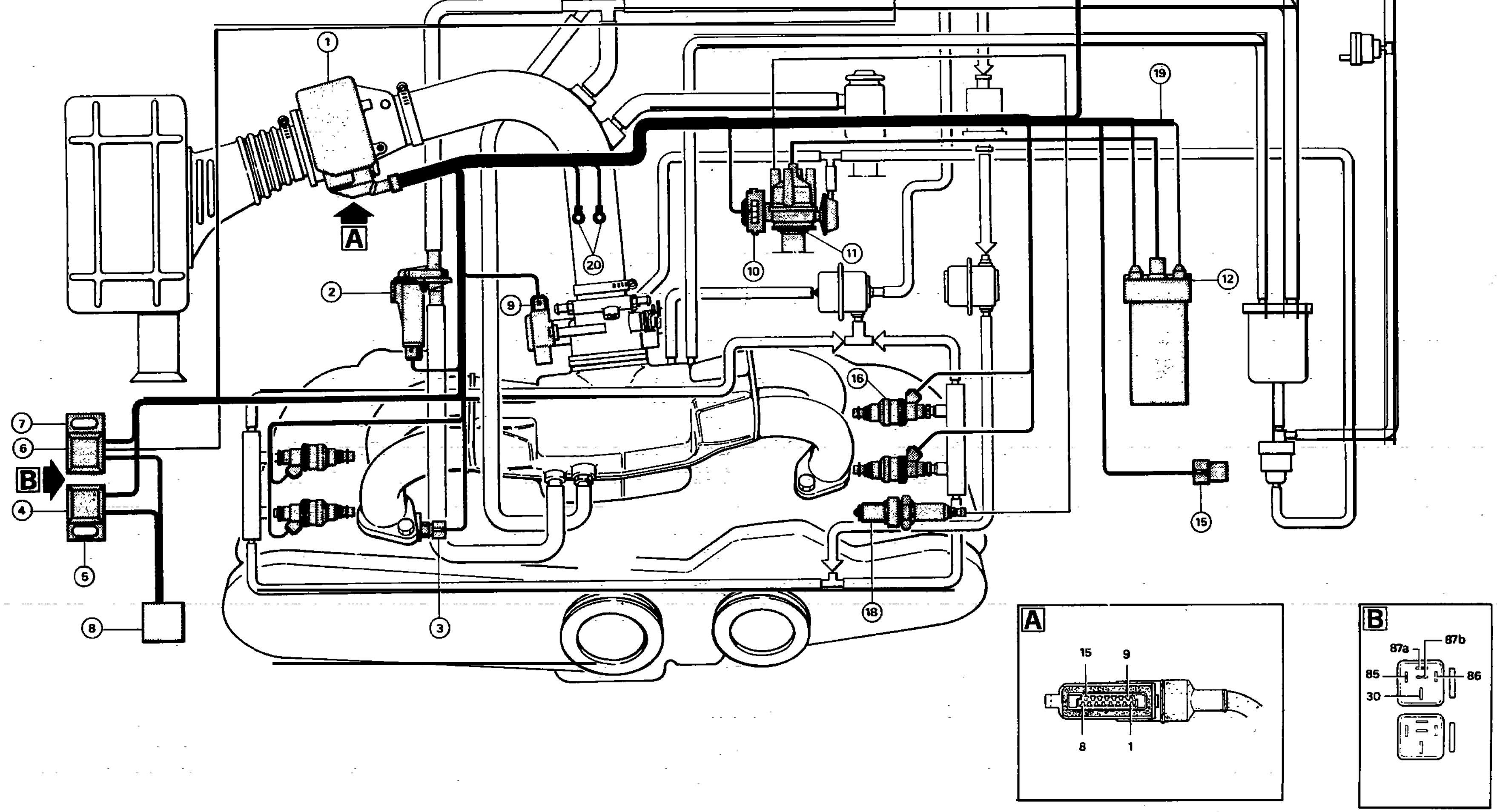
A1	Battery
A5	Ignition Distributor
A8	Ignition Coil
A12	Spark plugs
B1	Ignition Switch
C1	Electronic Speed Indicator
G1	Fuse Holder Box
G4	Fuse Holder Steering Wheel
G8	Simple Connection
G53a	Ground of Engine Compartment RH side
G60	Injection Wiring Ground
G67	Mototronic Connection
G73	Rear Service Connection
G89	Intermediate A Connection
G99A	Engine A Dashboard Connection
N1	Electronic Ignition Module
P18a	Petrol Main Motor-Pump
S3	Injectors
S6	Accelerator Throttle Body Switch
S7	Engine Cooling Fluid Temperature Sensor
S9	Supplementary Air Valve
S10	Lambda Probe
S11	Mototronic CU
S12a	Fuel Pump Mototronic Solenoid Starter
S12b	Diode Equipped Mototronic Solenoid Starter
S32	Lambda Probe Code

~DIAGNOSTIC AND CORRECTIVE INTERVENTIONS ON LE3.2 JETRONIC INJECTION/IGNITION SYSTEM

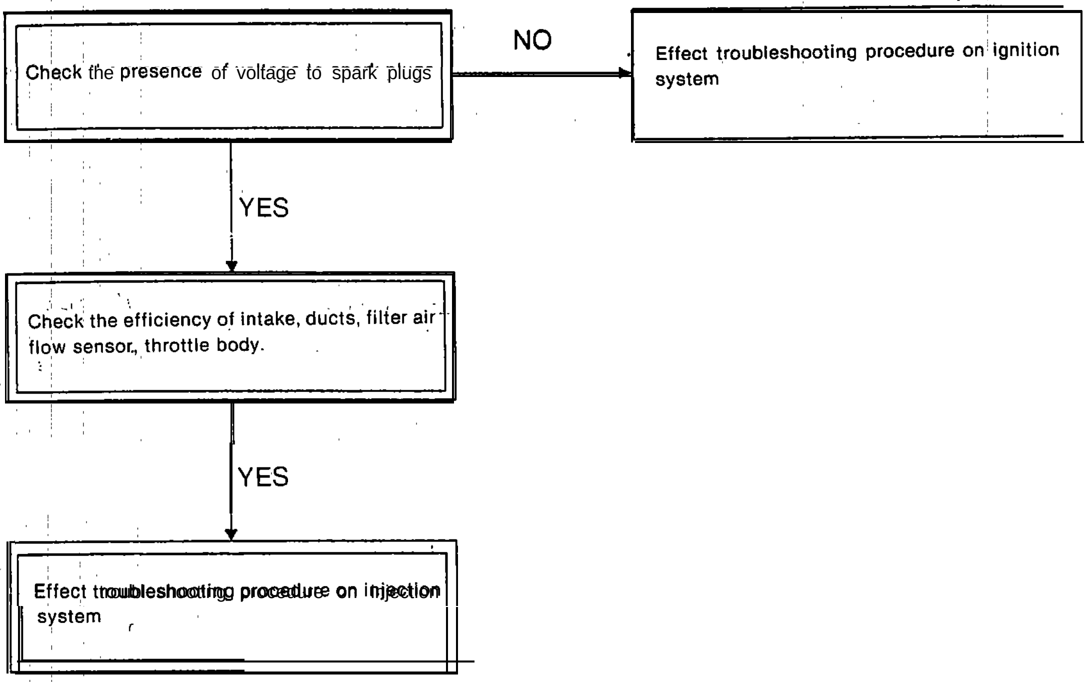
Procedures and diagrams
for electronic injection 1.7 engines without catalytic converter only

WIRING DIAGRAM OF INJECTION SYSTEM

1 AIR FLOW SENSOR, INJECTION CONTROL UNIT AND SUCKED AIR TEMPERATURE SENSOR (S11)
2 EXTRA AIR VALVE (S9)
3 ENGINE COOLANT TEMPERATURE SENSOR (S7)
4 MAIN RELAY (S12b)
5 LAMBDA PROBE FUSE (7.5A) (G4)
6 FUEL PUMP RELAY (S12a)
7 FUEL PUMP FUSE (15A) (G4)
8 BODY CONNECTION
9 THROTTLE MINIMUM AND MAXIMUM OPENING SWITHC (S6)
10 IGNITION MODULE (N1)
11 IGNITION DISTRIBUTOR (A5)
12 IGNITION COIL (A8)
12 DIGITAL IGNITION ECU (N20)
14 ELECTROINJECTORS (S3)
15 FUEL PUMP (P18a)
16 SPARK PLUGS(A12)
17 DETECTION OF ENGINE RPM
18 CENTRALISED GROUNDS (G60)



THE ENGINE DOES NOT START



THE ENGINE START WITH DIFFICULTY

Check ignition system (spark plugs, timing, etc.)

NO → Effect troubleshooting procedures on ignition system.

YES ↓

Check air supply system for leaks In intake ducts or clogged filter and fuel system pressure.

YES ↓

Check functionality of extra air valve.

WITH COLD ENGINE → With cold engine, 2 mins. after ignition throttle extra 'air valve pipe and verify that RPMs at minimum diminish noticeably.

NO ↓

Replace extra air valve.

WITH HOT ENGINE → With hot engine, 3 mins. after ignition throttle extra air valve pipe and verify that RPMs at minimum diminish noti-Ceably.

NO → With engine running verify presence of + 12 V on connector on wiring side of extra air valve.

YES ↓

Replace extra air valve.

NO ↓

Check wiring continuity between:

- extra air valve and G60 ground;
- extra air valve and fuel pump relay S12a terminal 87b

IRREGULAR IDLE RPM

Check for correct air flow through throttle body.
Check that there are no leaks in the air intake ducts and that the air filter is not clogged.

YES

Effect troubleshooting procedure for ignition system and injection system.

EXCESSIVE FUEL CONSUMPTION'

Check correct functionality of engine coolant temperature sensor and relative wiring by effecting test No. 5 of troubleshooting procedures for injection system.

YES

Ckeck electroinjector tightness.

YES

Check valve clearance for engine timing.

ANOMALIES IN ACCELERATION AND BURSTS IN RELEASING

Check correct fuel system pressure and ignition system efficiency (spark plugs, timing, etc.).

NO → Effect troubleshooting procedures for ignition system and effect test No. 1 of troubleshooting procedures for injection system.

YES

Check that there are no leaks in the air intake ducts.

YES

Check G60 ground efficiency.

YES

Check minimum and maximum throttle opening switch by effecting test No. 4 of troubleshooting procedures for injection system.

TROUBLESHOOTING PROCEDURE

FOR INJECTION SYSTEM

for electronic injection 1.7 engines without catalytic converter

NOTE:
THIS TROUBLESHOOTING MAINLY DEALS WITH THE ELECTRICAL/ELECTRONIC DIAGNOSIS OF THE SYSTEM AND SENSORS AND ACTUATORS ASSOCIATED TO IT.
IF AT THE END OF TESTS THE ANOMALY SHOULD REMAIN, IT WILL BE NECESSARY TO CHECK MAIN MECHANICAL DEVICES SUCH AS VALVES, CYLINDERS, COUPLINGS, TIGHTNESS OF AIR INTAKE DUCTS, ETC.

TEST No.1 — CHECK OF FUEL PUMP CONTROL

Check fuel' system pressure.
- Connect a pressure gauge to fuel circuit.
- Try a prolonged starting and check pressure presence between 2.8 bars and 3.2 bars.

NOTE:
The pump must turn for a few seconds even with the key in the "MARCIA" running position.

NO → **During a starting, check + 12 V on fuel pump terminals.**

YES → **Check fuel filter and any possible duct throttlings.**

YES → **Check efficiency of pressure gauge.**

YES → **Replace fuel-pump.**

NO → **Check G4 Fuse (15 A)**

YES → **Check that negative terminal of pump is at ground.**

YES →
- — Remove key.
- — Disconnect connector of injection ECU
- — Put at ground pin 12 of the same connector.
- — Rotate key to RUN position.

→ **Check that relay S12a is energized.**

YES → **Check that fuel pump rotates.**

NO → **Check circuit downstream from relay S12a up to 'fuel pump, beginning from terminal 87b of the same relay, and the circuit of terminal 30 of the relay itself.**

NO → **Restore wiring.**

YES → **Probable failure on ECU**
Go on with diagnosis.

→ **Eliminate ground connections on pin 12 ECU connector.**

NO → **Check electrical circuits consisting of:**
- terminal 85 of relay S12b and ground = 0 V
- terminal 86 of relay S12b and ground = 12 V

YES → **Replace relay S12a.**

NO → **Restore wiring of terminals 85 and 86 of relay S12a.**

YES → TEST No. 2

TEST No. 2, — CHECKING OF GROUNDS (PIN 4 AND 5, OF CU)

Set multimeter to 200 Ohm F.S.
Key removed.
Disconnect injection CU connector.

Check continuity between:
— pin 4 of CU connector and ground;
— pin 5 of CU connector and ground.

NO → Restore wiring between:
— pin 4 of CU connector and G60 ground;
— pin 5 of CU connector and G60 ground:
Check also G60 grounds functionally.

YES

TEST No. 3 — CHECK CONNECTION TO RPM SIGNAL (CU PIN 1)

Set multimeter to 200 Ohm F.S.
Key removed.
Disconnect injection CU connector.

Check wiring continuity between pin 1 of CU connector and terminai 1 of ignition coil.

NO → Restore wiring.

‘ES

TEST No. 4

TEST No. 4 — CHECK ON MIN. & MAX. THROTTLE OPENING SWITCH (CU PIN 15 AND 14)

Set multimeter to 200 Ohm F.S.
Key removed.
Disconnect injection electronic CU connector.

↓

Insert multimeter probes between CU connector pin 15 and ground.
Check the existance of a reslstance value lower than 10 Ohm.
Press accelerator and check an infinite resistance value.

NO → Check setting and efficiency of minimum opening switch. 1

YES ↓

Chech wiring continuity between:
- black wire bn S6 swifch connection and ground.

NO → Restore wlring.

YES ↓

Check wiring continuity between:
white wire on S6 switch connection and CU connector pin 15 for interruption, short-circuit on interference with other cables.

NO → Restore wiring.

YES ↓

Insert multimeter probes between connector pin 14 and ground.
Check the presence of an infinlte resistance value.
Fully depress the accelerator and check a resistance value lower than 10 Ohm.

NO → Check setting and effIciency of maximum opening switch.

YES ↓

Check wiring cxontinuity between yellow wire on S6 switch connection and CU connector pin 14, for interruption, short-circuit or interference with other cables.

NO → Restore wiring.

YES ↓

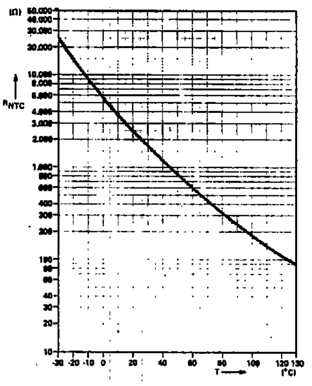
TEST No. 5

TEST No. 5 — CHECK OF ENGINE COOLANT TEMPERATURE SENSOR (CU PIN 8)

Set multimeter to 20 KOhm FS.
Key removed.
Disconnect injection electronic CU connector.

↓

Check between pin 8 of CU connector and ground, a reststance'value depending on engindcoolant temperature as per curve.



NO → Check wiring continuity between:
- electronic CU connector pin 8 and brown wire on S7 temperature sensor;
- G60 ground and black wire on S7 sensor connection 25.

NO → Restore wiring.

YES → Replace S7 sensor

YES → TEST No. 6

TEST No. 6 — CHECK OF ELECTROINJECTORS CIRCUIT

Set multimeter to 200 Ohm F.S.
Key removed.
Disconnect injection CU connector.

↓

Check resistance between CU connector pin 3 and terminal 87a of S12a relay.
Read from 3 to 5 Ohm.

NO → Disconnect electroinjectors removing relevant connectors.
Measure resistance on terminal of every single injector, that will result between 14 and 18 Ohm.

NO → Replace faulty injectors.

YES ↓

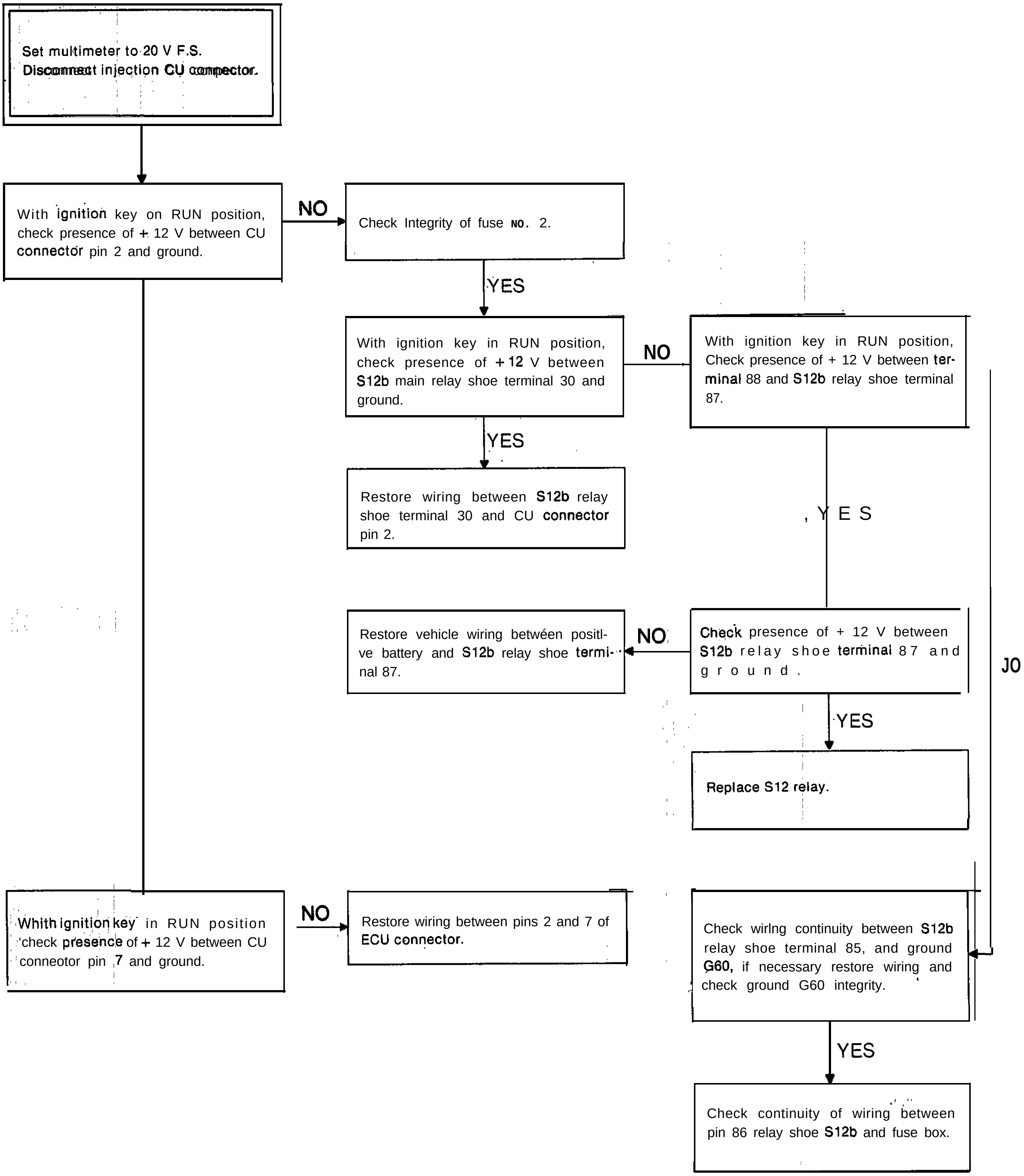
Check on single connectors of injectors WIRING SIDE, that one of two pins is connected to terminal 87a of S12a relay and the other to pin 3 of CU connector.

NO → Restore wiring.

YES ↓

TEST No. 7

TEST No. 7 — CHECK OF + 12 V PIN 2 AND PIN 7 OF CU



TROUBLESHOOTING PROCEDURE

FOR IGNITION SYSTEM

for electronic injection 1.7 engines without catalytic converter

NOTE:
THIS TROUBLESHOOTING PROCEDURE MAINLY DEALS WITH THE ELECTRICALIELECTRONIC DIAGNOSIS OF THE SYSTEM AND SENSORS AND ACTUATORS ASSOCIATED TO IT.
IF AT THE END OF TESTS THE ANOMALY SHOULD REMAIN, IT WI~LL BE NECESSARY TO CHECK MAIN MECHANICAL DEVICES SUCH AS VALVES, CYLINDERS, COUPLINGS, TIGHTNESS OF AIR INTAKE DUCTS, ETC.

THE ENGINE DOES NOT START

1. Check the presence of voltage to spark plugs (by attempting ignition).

- **NO** → Set multimeter to 20 V F.S. Key in RUN position. Check presence of + 12 V between ignition coil terminal 15 and ground.
  - **NO** → Check vehicle, system functionality (eg: continuity between ignition coil terminal 15 and starting block; starting block supply and functionality).
  - **YES** → Check presence of + 12 V between ignition CU connector pin 3 and ground.
    - **NO** → Restore wiring between CU (N20) connector pin 3 and coil (AS) terminal 15.
    - **YES** → Check presence of + 12 v between ignition module (NI) connector pin 4 and ground.
      - **NO** → Restore wiring between ignition module (N1) connector pin 4 and coil (A8) terminal 15.
      - **YES** → Set multimeter to 200 Ohm FS. Key removed. Check wiring continuity between ignition module (N1) connector pin 2 and ground.
        - **NO** → Restore wiring.
        - **YES** → Check ignition distributor functionality and integrity:
          cap:
          - cables;
          - distribution brushes;
          - Hall effect sensor.
          - **NO** → Replace anomalous components (cap, cables, brushes, sensor, etc.).
          - **YES** → Set multimeter to 200 Ohm F.S. Disconnect Hall sensor connector and ignition CU connector. Check wiring continuity between:
            . ignition CU connector pin 2 and screened cable braid on Hall sensor connector (wiring side).
            . ignition CU pin 4 and yellow wire on Hall sensor connector (wiring side).
            . ignition CU pin 12 and black wire on Hall sensor connector (wiring side).
            - **NO** → Restore wiring.
            - **YES** ↓
- **YES** → Check functionality of spark plugs and ignition order.

YES

Check wiring continuity (after having disconnected ignition CU (N20) connector and ignition CU (N1) connector between:

- ignition module connector pin 3 and ignition CU pin 1
- ignition CU connector pin 13 and ignition module connector pins 5 and 6
- ignition module connector pin 1 and white wire on ignition coil terminal 1.

NO → Restore wiring.

YES

Check ignition coil (A8) functionality verifying values listed hereunder:

- primary winding resistance: from 0.5 to 1.5 Ohm;
- secondary winding resistance: from 6 to 12 kOhm.

NO → Replace ignition coil.

YES

Disconnect white wire on coil terminal 1 (signal for speed indicator) and check that there is no short-circuit towards ground.

YES

Eventually replace ignition module (N1) and/or ignition CU (N20).

ADVANCE VARIATION CHECK

TEST No. 1

Connect stroboscopic gun and check:
- with cold engine advance higher than the piescribed value;
- with hot engine prescribed advance value.

YES → If any variation exists, but outslde the prescribed values, effect procedure for advance value adjustment as described at page 05.8.

NO ↓

Wlth engine' running steady disconnect engine coolant temperature sensor connector (L24) and read advance value. Connect to ground the brown-white wire of the sensor and check an advance variation with respect to that previously read.

NO → Disconnect ignition CU connector (N20) Check wiring continuity between ignition CU co.nnector pin 7 and sensor brown-white wire.

NO → Restore wiring.

YES → Replace ignition CU (N20).

YES ↓

Check sensor (L24) functionality.
- with, hot engine read approx. 0 Ohm between sensor pin and ground;
- with cold engine read infinite resistance between sensor pin and ground.

NO → Replace sensor (L24).

YES ↓

TEST No. 2

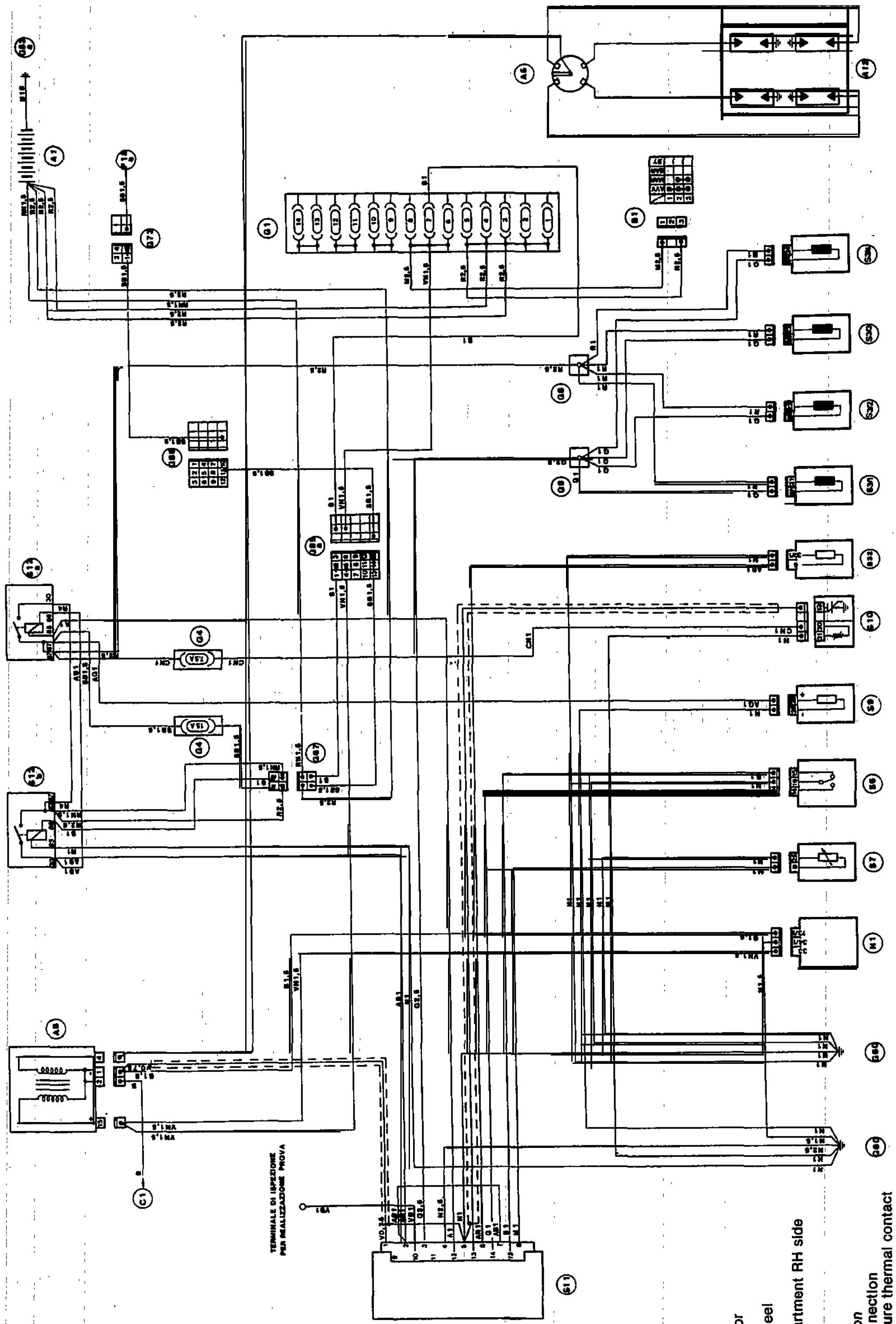
TEST No. 2

Box 1: Discinnect minimum and maximum thrdttle opening switch connector and read advance value.
Short-circuit pin 15 (white wire) with pin 16 (black wire) and check an advance variation with respect to thevalue previously read.

- NO → **Box 2:** Check wiring continuity between:
  - . connector pin 16 of minimum and maximum throttle opening switch S6 and ground G60.
  - . connector pin 15 of minimum and maximum throttle opening switch S6 and ignition CU N20 connector pin 6.
  - NO → Restore wiring.
  - YES → Replace ignition CU (N20).
- YES → Remove short-circuit between pin 15 and pin 16.
  - YES → **Box 3:** Read advance value.
    Short-circuit pin 14 (yellow wire) with pin 16 (black wire) and check an advance variation with respect to value previously read.
    - NO → **Box 4:** Check wiring continuity between:
      - . connector pin 14 of minimum and maximum throttle opening switch S6 and ignition CU connector pin 14.
      - NO → Replace ignition CU (N20).
      - YES → Restore wiring.
    - YES → Check adjt and efficiency of minimum and maximum throttle opening switch S6.

INJECTION - IGNITION WIRING DIAGRAM

for electronic injection 1.7 engines without catalytic converter only



A1 Battery
A5 Ignition Distributor
A6 Booster
A8 Ignition Coil
A12 Spark plugs
B1 Ingition Switch
C1 Electronic Speed Indicator
G1 Fuse Holder Box
G4 Fuse Holder Steering Wheel
G8 Simple Connection
G53a Ground of Engine Compartment RH side
G60 Injection Wiring Ground
G67 Connection
G73 Rear Service Connection
G89 *Intermediate A Connection*
G99a Engine A Dashboard Connection
L25 Engine Coolant temperature thermal contact
N1 Electronic Ignition module
N20 Advance variation CU
P18a Petrol Main Motor-Pump
S3 Electroinjectors
S6 Accelerator Throttle Body Switch
S7 Engine Coolant Temperature Sensor
S9 Supplementary Air Valve
S11 Ignition CU
S12a Fuel Pump Solenoid Starter
S12b Diode Equipped Solenoid Starter

Features \ Model		33 * / 33 1.3 / 33 1.3 S / 33 1.5 TI / 33 1.7 IE	33 1.7 *	33 1.5 axa	33 1.8 TD
Vehicle static loading arrangement (1)		A + B = 490 + 245 = 735 N (50 + 25 = 75 kg) C = 490 N (50 kg)			
Front wheel alignment	mm	$A = -12^{+10}_{-5}$		$A = -12^{+10}_{-5}$	$A = -2^{+10}_{-5}$
Rear wheel alignment	mm	$B = 27^{+10}_{-5}$		$B = 41^{+10}_{-5}$	$B = +33^{+10}_{-5}$
Front wheel toe-out (2) (3)	mm	M-H = 4 ± 2			M-H = 2 ± 2
Front toe-out angle		a = 10			a = 10'
Whael rim diameter	mm	340	365 (4)	340	
Rear wheel toe-in		α = − 20′ ± 10′			a = 0° ± 25′
Front wheel camber (3)		β = − 1° ± 30			β = − 1°55′ ± 30
Rear wheel camber (3)		β = 0° ± 25			
Front wheel caster (3)		y = 2" ± 30			y - 1° ± 30′
Steering lock (3)	Outer angle	δ_1 = 27° 50			δ_1 = 29° 38′
	Inner angle	δ_2 = 33° 45'			δ_2 = 35° 10

* Not marketed with 1.2 engine in all countries

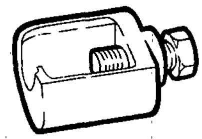
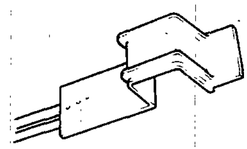
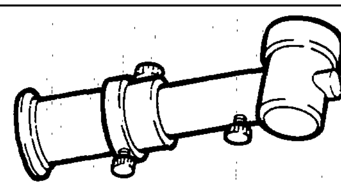
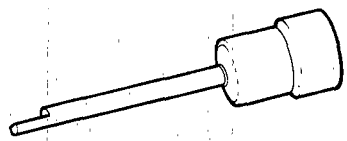
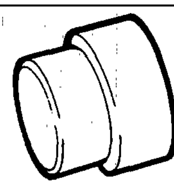
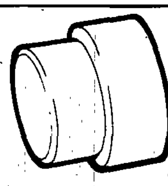
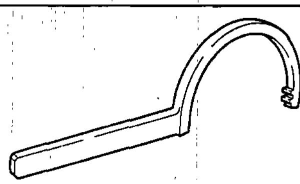
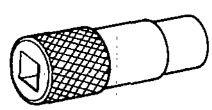
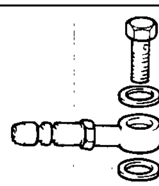
(1) Load vehicle, move it upand down on suspensions a few rimes. Checking operations must be performed with vehicle fully set up for driving.

(2) When turning a steering side rod joint by 360°, M — H dimension changes by 2 mm (0.079 in)

(3) These values are referred to a vehicle in nominal driving condition, i.e. with static load

(4) With rim 5 1/2 J x 14"

SPECIAL SERVICE TOOLS

Tool number	Tool name	Refer to page
A.3.0156	Puller of pin from stub axle 	—
A.4.0146	Tool for suspension height check 	
A.4.0149	Tool for suspension height check 	—
A.4.0150	Probe for suspension height check (to be used with A.4.0146 - A.4.0149 	—
A.4.0153	Magnetic adapter for suspension height check (to be used with A.4.0146 - A.4.0149) 	—
A.4.0206	Magnetic adapter for suspension height check (to be used with A.4.0146 - A.4.0149) 	—
A.50195	Toothed wrench for locking camshaft pulley 	—
A.5.0212	Wrench for exhaust gas sampling plug 	00-14
C.2.0051	Fitting for exhaust gas sampling 	00-14

GROUP 01

CONTENTS

(*) Refer to "VORKSHOP MANUAL "VOLUME I and VOLUME II - Group 01

DRIVE UNIT REMOVAL AND INSTALLATION

These procedures are for electronic injection 1.7 engines

REMOVAL

1.7 I.E. with catalytic converter

During engine removal from car, it is necessary to remove engine and gearbox - differential as single unit. Put the vehicle on the auto lift and engage first gear.

WARNING:
Great care is required when dealing with a hot engine.

1. Preliminary operations

a. Operating from passenger compartment, withdraw knob from gear lever, then remove the two protective rubber gaiters from gear lever.
b. Remove fhe hood.
c. Working from inside the engine compartment, disconnect the battery ground cable.

For following procedure steps, refer to figure at page 01-3.

2. Air filter, air flow sensor and sleeve removal.

a. Unhook air filter cover (37) and remove filter element.
b. Disconnect multiple connector (7) from air flow sensor (3).
c. Disconnect pi e (16) from oil vapour separator (61).
d. Disconnect metal fitting (14) from sleeve (9).
e. Unscreew the three fixing screws of air flow sensor (3) to support (6)
f. Loosen sleeve (9) fixing clamp to throttle body (10).
g. Remove air filter cover (37) complete with air flow sensor (3) and sleeve (9).
h. Unscre the three support (6) fixing nuts and bolts and remove the support from body.

3. Removal 'of spark plugs supply cables.

a. Disconnect high voltage cables from spark plugs and coil.
b. Disconnect the ignition distributor cap (12) and remove it complete with leads from engine.

4. Removal of air and fuel vapour pipes

Disengage the following pipes, disconnecting them from stated components:
- Pipes (28) and (29) from supply manifold (30).
- Pipe (15) from throttle body and pipe (11) from pneumatic gauge on ignition distributor (12)
- Pipe (13) from metal fitting (14).
- Pipe (33) from idle rpm setting fitting.
- Pi e (32) from supply manifold (30).
- Pipe (27) unscrewing fitting on supply manifold (30)

5. Removal of cooling system piping

a. Unscrew and remove the coolant expansion tank plug.
b. Raise the car from beneath, referring to Figure at page 01-6, iemove the right hand drain plug and then the left hand drain plug (5) under the cycinder block and drain off the coolant; screw on the plugs again after draining and relower the car.

Put a suitable conteiner under the car to collect the coolant.

c. From the part stated, disconnect the following oses and sleeves:
- Sleeve (34) from thermostat and radiator and remove it.
- Sleeve (32) from the union on the engine.
- Hose (4) from throttle body (10).
- Hose (1) from T fitting on engine rear side.

6. Removal of fuel hoses

a. Discinnect hose (24) from damper (26).
b. Disconnect hose (25) from pressure gauge (23).

7. Removal of eccelerator control cable

a. Rotate the accelerator lever (31) and withdraw the pawl on control cable end.
b. Remove split ring and draw the accelerator cable sheath from the bracker.

6. Removal of ignition/injection wiring

a. Disconnect the two Lambda proble connections (20) and disengage cable from clamps.
b. Unscrew the two fixing screws and remove the solenoid starters (36) from body.
c. Disconnect connection (35) between injection/ignition wiring and vehicle wiring.
d. Disconnect connector (8) from the switch on throttle body (10).

9. Removal of supply manifold

Unscrew the three fixing nuts to the two supply manifold (30) ends and remove it with its relevant gaskets, complete with throttle body.

- **The two central nuts also fix the engine lifting brackets (2); on right side the bracket supporting the oil dipàstick is also fixed.**
- **Suitably plug the intake manifold on engine.**

10. Removal of the clutch control hose

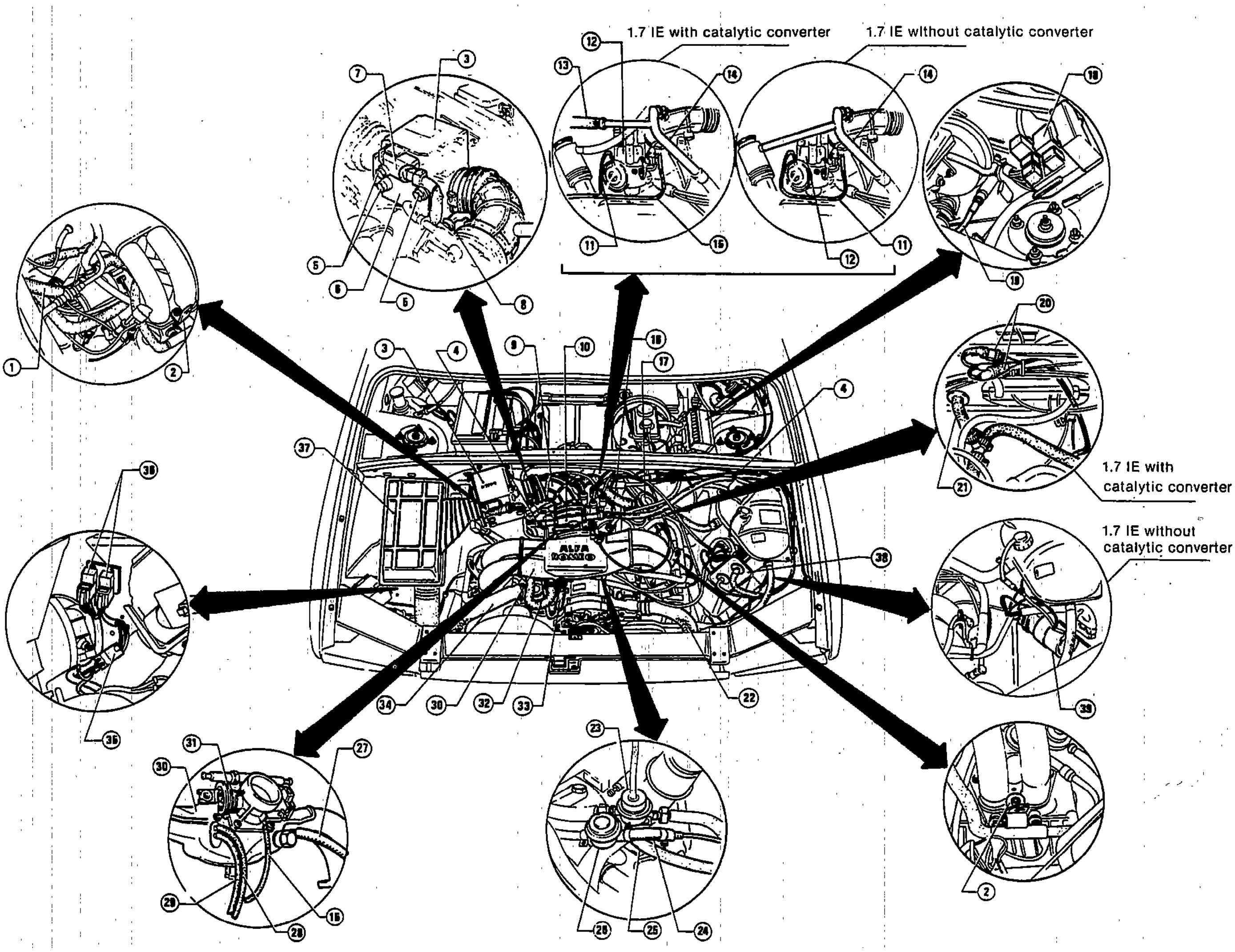
a. Extract the fuseholder box (18).
b. Unscrew 'the pipe fitting (19) of clutch pump and withdraw the hose from service tank sheet.

LOCATION OF **DRIVE** UNIT ENGINE MOUNTINGS

As for

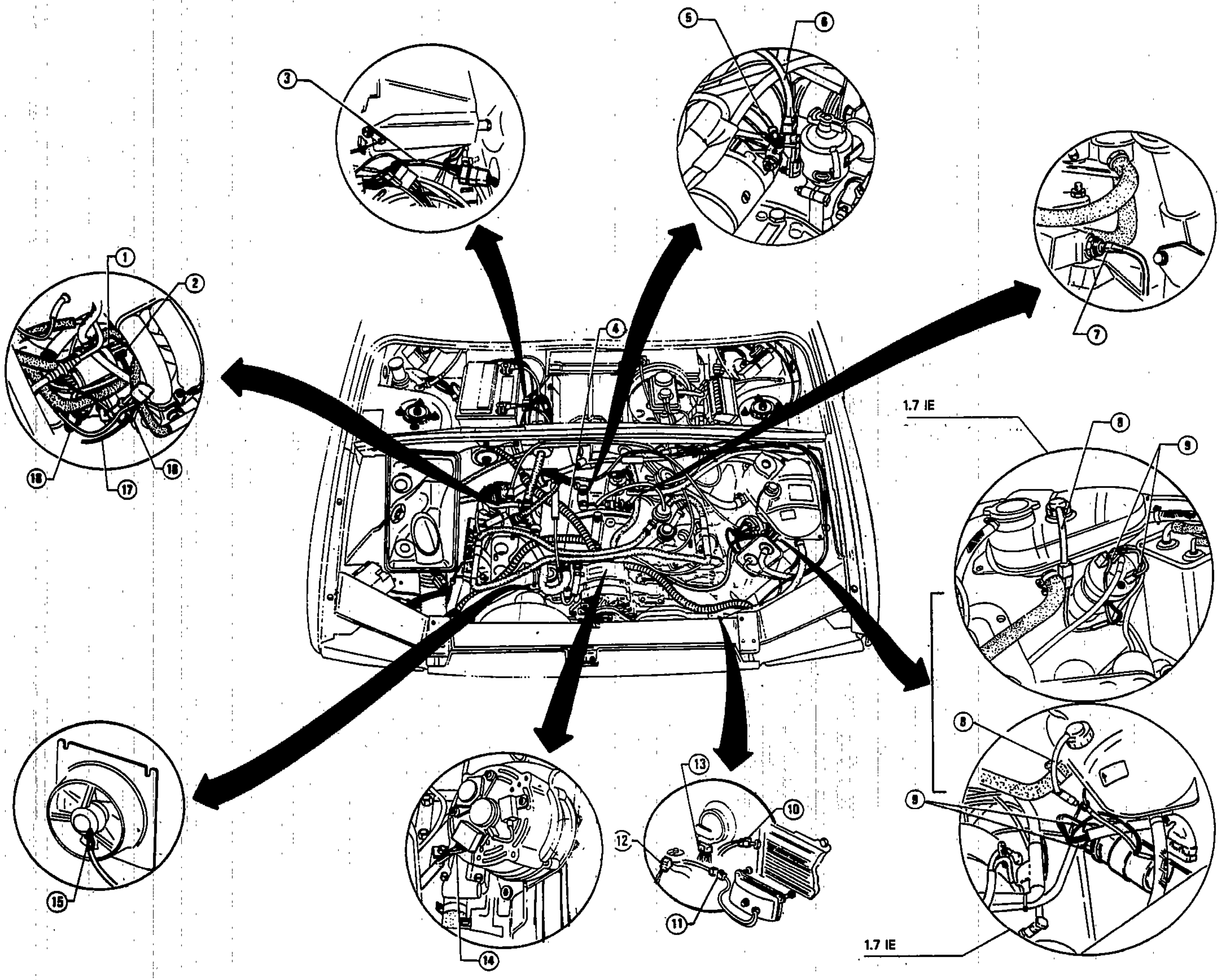
ENGINE COMPARTMENT - LOCATION COMPONENTS

Engine 1.7 **Electronlc Injectlon**



1 **Coolant** delivery **hose** . to **radlant**
2 Englne **liftlng brackets**
3 **Alr flow/Injection** CU **sensor**
4 **Coollng** system breather pipes
5 **Alr flow sensor** fixlng **screws**
6 **Alr flow sensor** support
7 Injection wlrlng **multlple connector**
8 Throttle body swltch conneotor
9 Corrugated **sleeve**
10 Throttle body
11 Vacuum plpe **to** set pneumatlc advancs
12 Ignltlon dlstrlbutor
*13 **Alr delivery** tube to fuel **vapour fllter**
14 **Metal** flttlng
*15 Vaouun dellvery tube for pneumatfc **advance** control Ignltlon dlstrlbutor
16 **Oil vapour recovery** tube
17 **Oil vapour** a r a t o r **(oil fllling unlon)**
15 Fuseholder box
19 **Pipe** of clutch control **hvdraulic svstem**
*20 Lambda probe connectlon
21 Retum **plpe** of **coolant** from **radlant**
22 **Sleeve** of return **coolant from** radlator
23 Pressure gauge
24 Fuel dellvery **tube**
25 **Excess** fuel **return** tube
26 **Damper**
27 **Servobrake vacuum** pipe
25 Vacuum pipe for fuel **vapour filter**
*29 Vacuum plpe for fuel pressure **gauge**
30 Alr **supply** malnfold **(alr Intake** box)
31 Accslerator throttle control lever
32 **Supplementary air** feed tubs
33 **Idle regulatlon by-pass** tube
34 Collant dellvery **sleeve to** radlator
35 Connectlon between **injectlon** wlrlng and **vehicle** wlrlng
36 **Injectlon** wlrlng **solenold** starters
37 Alr **fllter cover**
38 **Fuelvapour fllter**
39 **Coll**

(*) For 1.7 IE wlth **catalytlc converter only.**



1 Starter energizing cable
2 Starter supply cables
3 Odometric sensor cable
4 Engine compartment wiring
5 Ground cable wiring
6 Power module on ignition distributor
7 Engine coolant temperature indicator cable
8 Engine coolant minimum level sensor cable
9 Coil low voltage cable
10 Electric fan cables for thermal contact consent
11 Foglamps cables
12 Horn cables
13 Front optical groups supply cables
14 Alternator = and alternator warning light supply cable
15 Electrical fan supply cables
16 Min. level oil sensor cable
17 Engine max. oil pressure warning cable
19 Engine min. oil pressure warning cable

1.7 IE with catalytic **converter**

1.7 IE without catalytic **converter**

VIEW OF ENGINE COMPARTMENT LOCATION OF WIRING

11. Removal of electrical cables

For following removals, refer to figure at page 01-4.

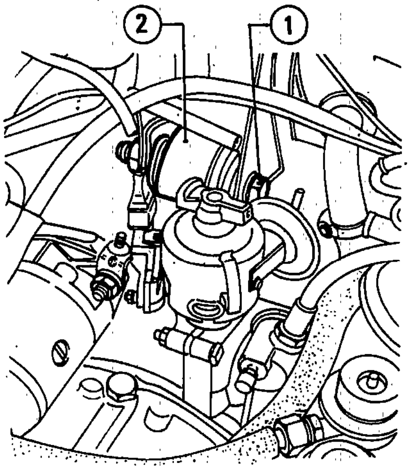
a. 'Disconnect the following electrical cables, removing them from stated component:

- cables ⑬, from optical groups.
- cables ⑪, from foglamps connectors.
- cables ⑫, from horns.
- cable 6 from the movable connection of engine coolant minimum level sensor.
- low voltage cables ⑨ from coil.
- cables ⑩, from thermal contact of electric fan consent on radiator.
- cables ⑮, from electric fan connections
- cable ⑭, removing the pressure mounted connector on alternator.
- cable ⑦, from engine collant temperature sensor.
- cable ①, energizing the starter from movable connection.
- cable ②, supplying the starter terminal.
- cable ⑱, from engine minimum oil pressure handcontact.
- cable ⑰, from engine maximum temperature thermal contact.
- cable ⑯, from oil level dipstick.
- Ground cable ⑤ unscrewing the engine cylinder block nuts, rear side.

b. Release all wiring from wireblock and disengage them from the engine in' order not to obstruct their removal.
b. Disconnect odometer cable ③ connection, located in service tank.

12. Loosening nut of engine central support

With reference to the following figure loosen bolt ① fixlng central support ② to the body without removing it.



1 Bolt
2 Central support

For following procedure steps, refer to Figure at page 01-6.

13. Oil draining
(if required, as a function of 'intervention to be c'arried out)

a. Raise the car on auto lift.
b. Unscrew cap ⑩ and drain engine oil. Rescrew the cap, when this operation has been com leted.
c. Unscrew cap ⑮ and drain gear box-differential oil. Rescrew the cap when this operation has been completed.

14. Removal of exhaust pipe

a. Disconnect mainfolds ⑨ from engine right and left heads, unscrewing the relevant fixing nuts.
b. Unscrew the three bolts ⑬ connecting discharge mainfolds ⑨ to catalytic muffler ⑭ and disconnect them recovering the gasket.

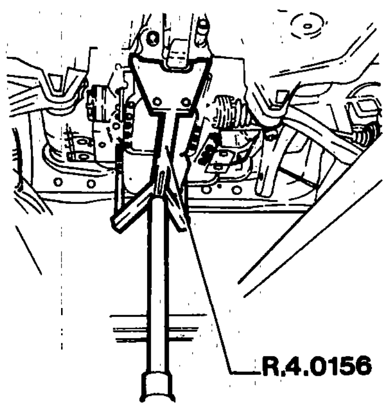
c. Remove the discharge mainfolds ⑨ recovering the gaskets and withdrawing from bottom the wirlng of lambda probe, previously disconnected.

15. Removal of reversing light cable

Disconnect reversing light cable ⑪ from gearbox switch.

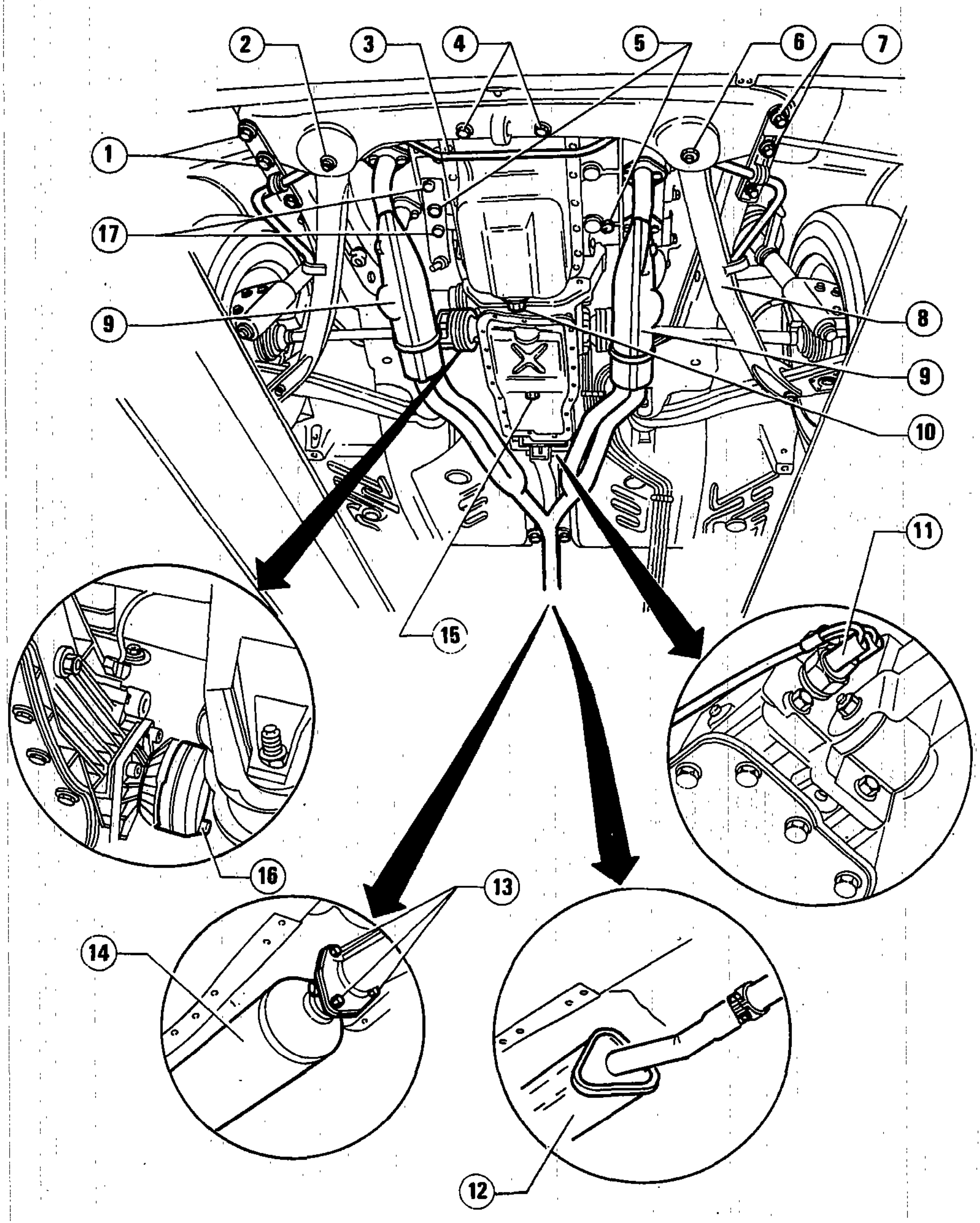
16. Mechanical disconnection and removal of drive unit

a. Unscrew screws ⑯ fixing right and left semishafts to rlght and left shafts of the dlfferential, and disengage the semishaft.
b. Unscrew to bracket attachment screw ⑰ on the engine antishock support bracket and position a column lifter under the drive unit. This column lifter will be fitted with a suitable supporting bracket R.4.0156 to take part of the drive unit weight.
c. Lqosen and remove the two screws ④ fixing the engine front support to cross member.



d. Loosen and remove the remaining screws ① and ⑦ fixing the front cross member to body.
e. Loosen bolt ② connecting front traverse to right strut.
f. Unscrew and remove the bolt ⑥ connecting the front cross member to the left strut ⑧; then disengage the strut from the cross member.

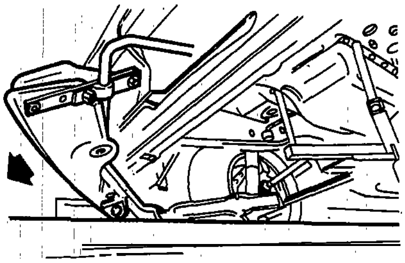
VIEW OF UNDERPART OF VEHICLE - LOCATION OF COMPONENTS



1 Screws fixing cross member to body
2 Cross member to right strut connecting bolt
3 Stabilizing bar
4 Screws fixing engine front support to crossmember
5 Coolant drain plugs
6 Cross member to left strut connecting bolt
7 Cross member to body fixing screws
8 Suspension left strut
9 Exhaust manifolds
10 Engine oil drain plug
11 Reverse light cable
12 Muffler central silencer
* 13 Exhaust manifold-catalytic muffler fixing bolts
. 14 Catalytic muffler
15 Gear box differential oil drain plug
16 Constant velocity joint screws
17 Bracket screws supporting engine anti-shock supporting bar
18 Exhaust manifold flange nuts

(*) For models with catalytic converter only

g. Unscrew and remove the two bolts ③ connecting the front cross member to the left strut ⑧.
h. Swing the front cross member round as shown in the illustration to allow the drive unit to be taken out downwards.



i. Unscrew and remove the two screws fixing the drivce unit rear support ⑫ to the body.
I. Remove bolt fixing engine central support to body, unloosened at step 1 2 .
m. Lower column lift and take the drive unit out from the engine compartment.

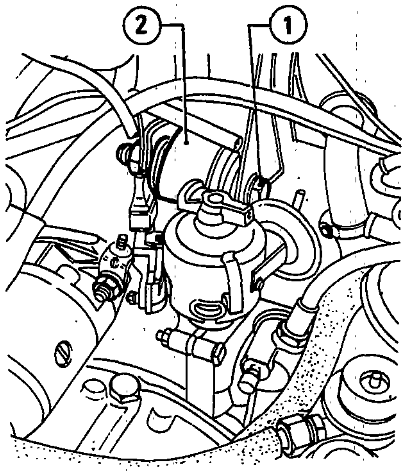
INSTALLATION
1.7 IE with catalytic converter

1. Preliminary Operations

CAUTION:
Drive unit assembly must be performed in such a way that the gfearboz rear support and the engine front support are not respectively upwards and longitudinally preloaded.

---

a. Raise the drive unit with the column lifter used for disassembly until the centre support axis ② is ai about the halfway point of the body slot and tighten the relevant bolt ①.

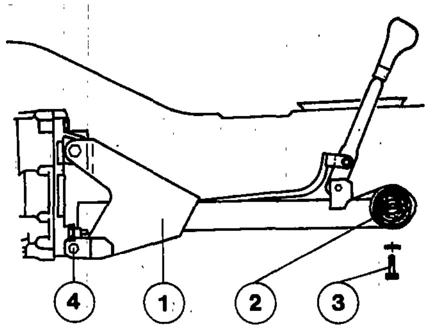


1 Bolt
2 Central support

b. With referdnce to figure at page 01.6, rotate the front crossmember complete with stabilizing bar in mounting position and fix it with bolt ⑥ to strut ⑧ then fully tighten bolts ⑥ and ②.
c. Tighten screws ④ fixing the engine front support.
d. Tighten !he foilowing components to the specified torque.

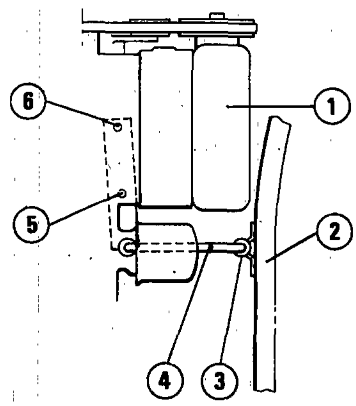
Ⓣ Tightening torques
- crossmember an6 stabilizing bar bïacket **to** body
  66,5 ÷ 83,3 N.m
  (6,8 ÷ 8,5 kg.m)
- **Screws fixing stabiliting bar to strut**
  14,7 ÷ 23,5 N.m
  (1,5 ÷ 2,4 kg.m)
- **Screws connecting semishaft . differential shafts (in engine oil)**
  33 ÷ 36 N.m
  (3,4 ÷ 3,7 kg.m)

e. With reference to following figure remove lift and loosen lower bolt ④ fixing the rear support to gear box.
f. Insert pin ② into the elastic joint of rear support ①, position it on relevant point fixing it to body and tighten screws ③.
g. Retighten lower nut ④



1 Rear support of gearbox
2 Pin
3 Rear support securing screw
4 Bolt securing gearbox rear support

h. Insert the side rod ④ into support ③ on right side longitudinal member ②, then lock screw ⑥ first and then screw ⑤.



1 Right cylinder head
2 Right side longitudinal member
3 Support
4 Side rod (engine antishock bar)
5 Front screw
6 Rear screw

2. Reinstallation of reverse light cable and of exhaust pipe

a. Reconnect the reverse light cable to gearbox switch.
b. Remount exhaust mainfolds in reverse order with respect to removal, new gaskets between mainfolds and engine cylinder heads and between mainfolds and catalytic muffler.

3. Reassembly of electrical cables

Lower the auto lift and, with reference to figure on oage 01-4, reconnect electrical cables working in reverse order to that described under "Removal" step 11.

For following procedures steps, refer to Figure 01-3.

4. Reassembly of, clutch control hose

'Refit hose ⑲ to clutch pump and fully tighten it.

5. Reassembly of air intake manifold

Refit inlet manifold ㉚ on intake manifolds, fitting new gaskets, then tighten securing nuts.

Mind that central nuts on two sides of the manifold~ serve also to fix brackets ②.

6. Completion of reassembly

a. Reconnect injection/ignition wiring in reverse order to that described under "Removal" - Step 8.
b. Reconnect the accelerator cable to lever ㉛ on throttle body.
c. Reconnect hoses ㉔ and ㉕ respectively to damper ㉖ and pressure gauge ㉓.
d. Reconnect pipelines of engine cooling system in reverse ordxer to that described under "Removal"' - Step 5.
e. Reconnect fuel vapour and air in pipelines in 'reverse order to that described under "Removal" - Step 4.
f. Reconnect cables supplying spark plugs and reinstall the ignition distri'butor cap ⑫.
g. Reinstall air filter cover ㊲, air flow sensor ③ and corrugated sleeve ⑨ in reverse order to that described under "Removal" - Step 2.

h. Remount hood.
i. Remount the battery negative terminal.
l. Operating inside the passenger compartment refit the gear lever knob and rubber gaiters on the gear lever.

REMOVAL

1.7 IE without catalytic converter

During engine removal from the car, it is necessary to remove engine and gearbox-differential unit as a single unit. Put the vehicle on the auto lift and engage first gear.

WARNING:
Great care is required when operating on a hot engine.

---

1. Preliminary operations

Operate as described at Step 1 page *o-2*
For the following procedure steps refer to Figure at page 01-9.

2. Air filter, air flow sensor and sleeve removal

Operate as described at Step 2 page *01-2.*

3. Removal of spark plugs supply cables

Operate as described at Step 3 page 01-2.

4. Removal of air pipes

Disengage the following pipes, disconnecting them from stated components:

- Pipe ㉘ from supply manifold ㉚.
- Pipe ⑮, from throttle body and pipe ⑪ from pneumatic gauge on ignition distributor ⑫.
- Pipe ㉝, from idle RPM setting fitting.
- Pipe ㉜, from supply manifold ㉚
- Pipe ㉗ unscrewing fitting on syp-ply manifold ㉚

5. Removal of cooling circuit pipes

Operate as described at Step 5 page 01-2.

6. Removal of fuel supply hose

Operate as described at Step 6 page 01-2.

7. Removal of accelerator control cable

Operate as described at Step 7 page 01-2.

8. Removal of ignition/injection cables
a. Unscrew two screws and remove solenoid starters ㊱ from body.
b. Disconnect connection ㉟ between ignition/injection wiring and vehicle wiring.
c. Disconnect connector ⑧ from throttle body'switch ⑩.

9. Removal of supply manifold

Operate as described at Step 9 page 01-2.

10. Removal of clutch control hose
Operate as described at Step 10 page *01-2.*

11. Removal of electrical cables

Operatè as described at step 11 page '01-5 with reference to Fig. page 01-4.

12. Loosening nut of engine central support

Operate as described at step 12 page 01-5.
For'following procedure steps refer to Figure at page 01-6.

13. Oil drain'ing

(if required, as a function of intervention to be carried out, operate as described at step 13 page 01-5).

14. Removal of exhaust pipe.

a. Disconnect exhaust gas manifolds from right and left engine heads, unscrewing the relevant fixing nuts 18.
b. Discqnnect exhaust pipe on vehicle rear side unscrewing screw of connecting clip to final trunk of exhaust pipe and remove it from elastic support.

Removal of reversing light cable

Disconnect reversing light cable 11 from gearbox switch.

16. Mechanical disconnection and removal of drive unit.

Operate as 'described at step 16 page 01-5.

INSTALLATION

1.7 IE without catalytic converter

1. **Preliminary operations**

Operate as described at step 1 page 01-7.

2. Reinstallation of reverse light cable and of exhaust pipe.

a. Reconnect reverse light cable to gearbox switch.
b. Remount exhaust manifold operating in reverse order to removal, with new gaskets between manifolds and engine heads.

3. Reassembly of electrical cables.

Lower the auto lift and, with reference to figure on page 01-4, reconnect electrical cables working in reverse order to that described T "Removal" step 11.

For following procedure steps, refer to Figure 01-3.

4. Reassembly of clutch control hose

Refit hose ⑲ to clutch pump and fully tighten it.

5. Reassembly of air intake manifold

Refit inlet manifold ㉚ on intake manifolds, fitting new gaskets, then tighten securing nuts.

Mind that the central nuts on two sides of manifold serve also fix brackets ②

6. Completion of reassembly

a. Reconnect injection/ignition wiring in reverse order to that described under "Removal" step 8.
b. Reconnect accelerator cable to lever ㉛ ON THROTTLE BODY.
c. Reconnect hoses ㉔ and ㉕ respectively to damper ㉖ and pressure gauge ㉓ .
d. Reconnect pipelines of engine cooling system in reverse order to that described under "Removal" step 5.
e. Reconnect cables supplying spark plugs and reinstall ignition distributor cap ⑫ .
f. Reinstall air filter cover ㊲ , air flow sensor ③ and corrugated sleeve ⑨ in reverse order to that described under '"Removal" step 2.
g. Remount hood.
h. Remount battery negative terminal.
i. Operating inside the passenger compartment refit the gear lever knob and rubber gaiters in the gear lever.

REFILLING AND ADJUSTEMENTS

a. Refill engine and gearbox-differential with type and quality of oil recommended.

WARNING:
Before refilling with oil, make sure that the engine pump drain plug and gearbox drain plug have been screwed back on.

ENGINE OIL

Type:

AGIP Sint 2000 SAE 10W/40
IP Sintiax SAE 10W/40
SHELL Super Plus Motor Oil SAE 15W/50

Oil quantity for full refilling (Pump, filter and ducts):
4,1 l

GEARBOX-DIFFERENTIAL OIL

Type:

AGIP Rotra MP SAE 80W/90
IP Pontiax HD SAE 80W/90
SHELL Spirax HD SAE 80W/90

Quantity:
2,4 kg

b. Effect cooling system refilling with speciasl fluid (See: Group 00 - Engine Maintenance - Basic Mechanical System).

c. Effect the setting of the accelerator control cable (see: Group 00 - Engine Maintenance - Engine Supply).

d. Bleed the clutch hydraulic system and top up said circuit (as per Alfa 33 - Group 12).

e. Start the engine and, when at normal running temperature, check correct engine idle rpm running, the correct ignition timig and CO percentage at exhaust.

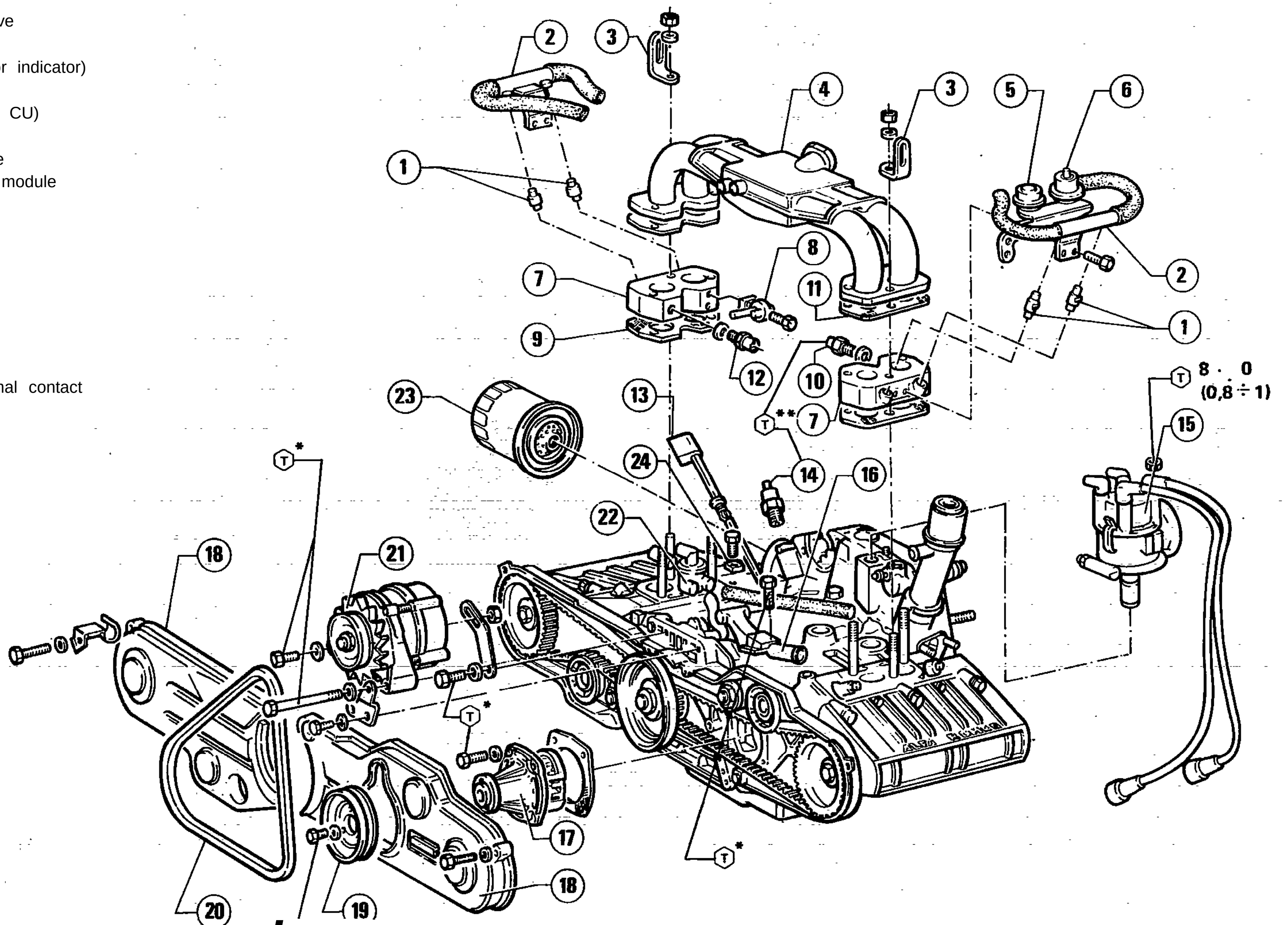
For engine tuning see Group 00 - Engine Maintenance.

ENGINE DISASSEMBLY

These procedures are for electronic injection 1.7 engines

Outer parts

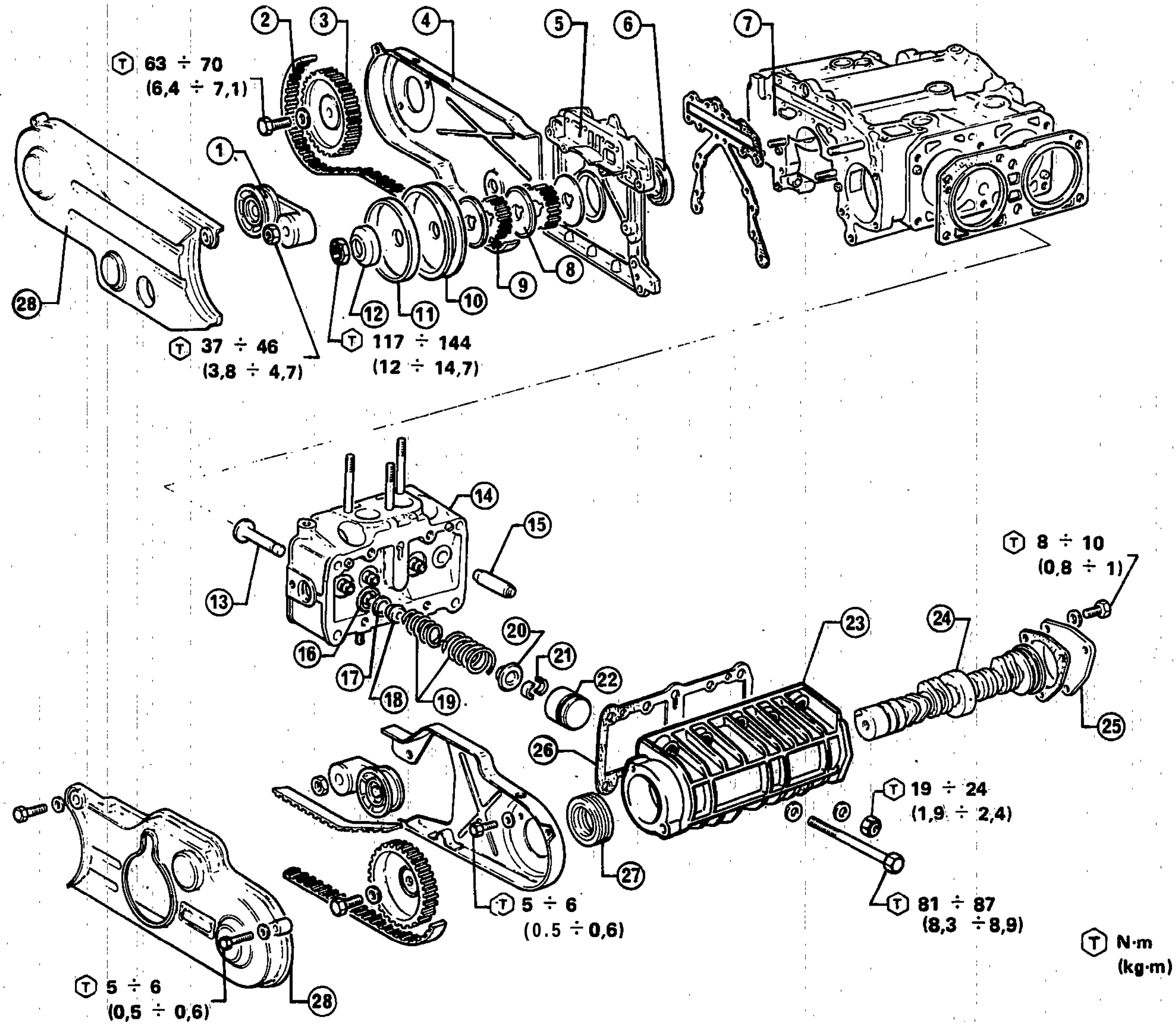
1 Electroinjectors
2 Fuel supply manifold
3 Lifting brackets
4 Supply manifold
5 Fuel puise damper
6 Fuel pressure gauge
7 Intake manifolds
6 Supplementary air solenoid valve
9 Gasket
10 Coolant temperature sender (for indicator)
11 Gasket
12 Coolant temperature sender (for CU)
13 Dipstik
14 Single contact min. oil pressure
15 Ignition distributor with power module
16 Union
17 Coolant pump
16 Front protection of drive belts
19 Water pump pulley
20 Water pump alternator belt
21 Alternator
22 Thermostat
23 Oil filter
24 Max. engine temperature thermal contact



8 ÷ 10
(0,8 ÷ 1)

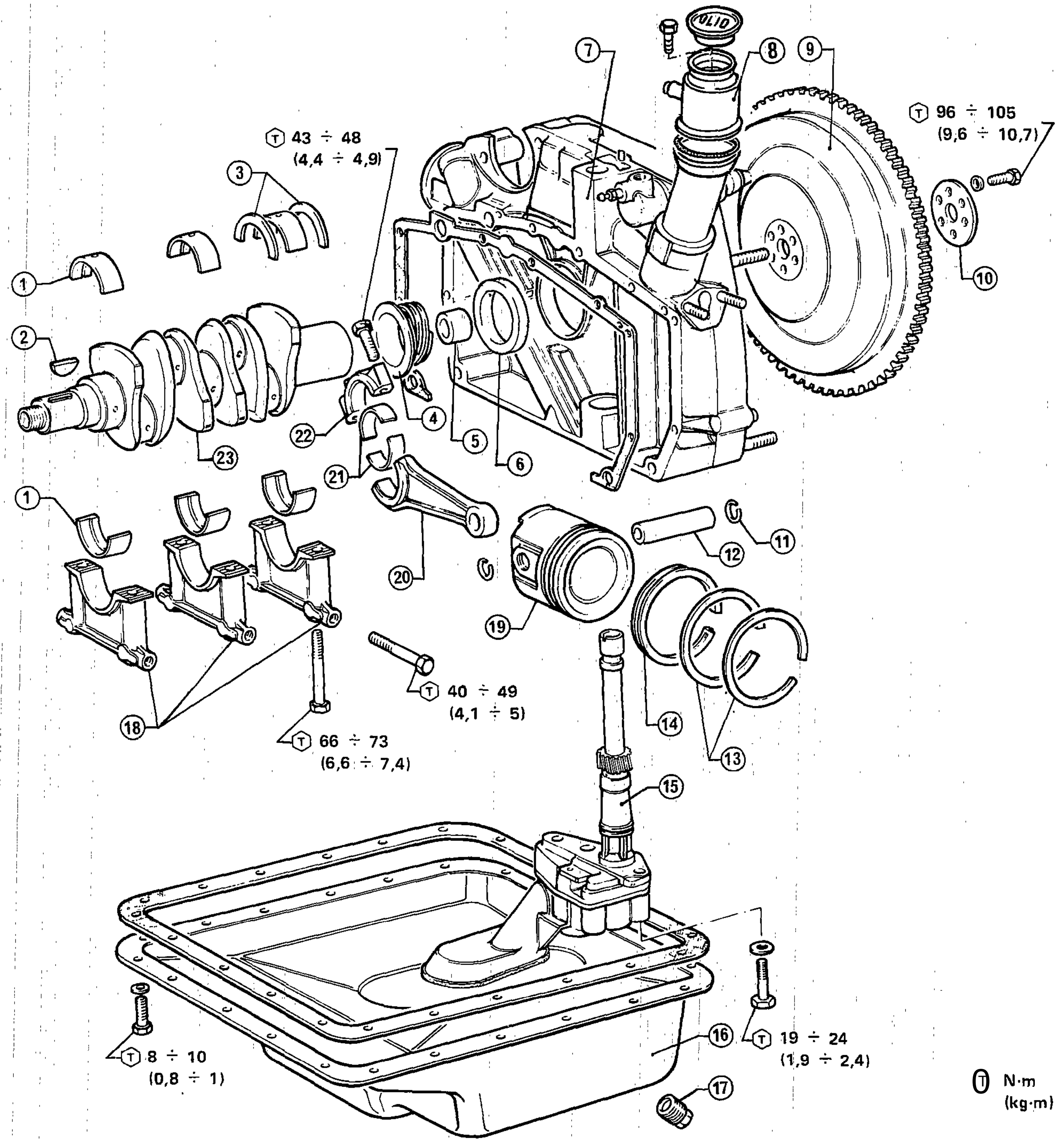
T N·m (kg·m) T* 19 ÷ 24 (1,9 ÷ 2,4) T** 33 ÷ 41 (3,4 ÷ 4,2)

Internal ' parts



1 Jockey puylley
2 Timing belt
3 Right tlmin pulley
4 Timing belt rear cover
5 Englne front cover
6' Crankshaft seal ring
7 Engine block
6, Spacer
9 Timlng Pulley
10 Water-pump-alternator pulley
11 Spacer
12 Washer
13 Valve
14 Cylinder head
15 Valve guide
16 Lower spring seat
17 Washer
19 Seal cap
19 Springs
20 Spring seat
21 Cotters
22 cup
23 Camshaft Support
24 Camshaft
25 Cover
26 Gasket
27 Seal ring
26 Timing belt front cover

Internal parts

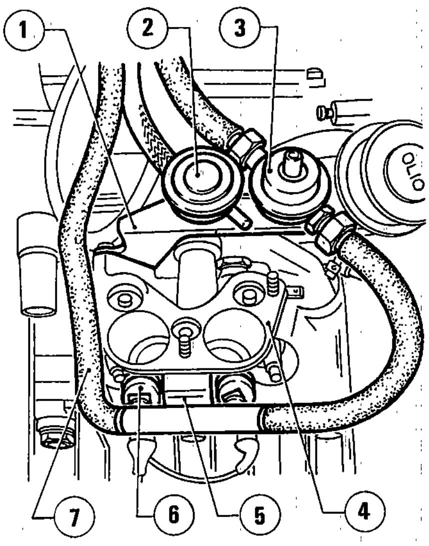


1 Main bearings
2 Woodroff key
3 Thrust half-ring
4 Oil pump gear
5 Bush
6 Seal ring
7 Rear cover
8 *Oil vapour separator filler inlet*
9 Flywheel
10 Washer
11 Lock ring
12 Pin
13 Compression rings
14 Oil scraper ring
15 Oil pump
16 Oil sump
17 Engine oil drain plug
16 Main bearing caps
19 Piston
20 Connecting rod
21 Connecting rod bearings
22 Connecting rod cap
23 Crankshaft

PRELIMINARY OPERATIONS

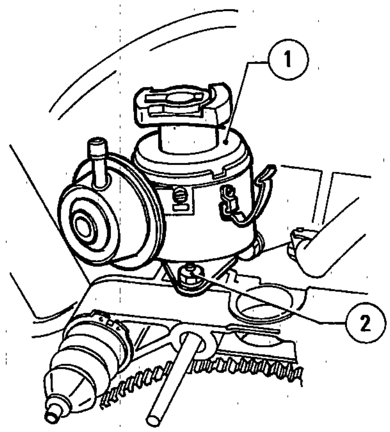
1. Remove drive unit from car according to procedures: Drive Unit Removal and Installation.

2. Remove gearbox - differential unit and clutch unit from engine according to procedures: Separation and Assembly of the Units (see: "WORKSHOP MANUAL Alfa 33" - Group O-I).



1 Bracket
2 Damper
3 Fuel pressure gauge
4 Intake manifold
5 Bracket
6 Injector
7 Fuel supply hose

4. **Remove** spark plugs and ignition **distributor.**
(1) Unscrew and remove spark plugs from cylinder heads.
(2) Loosen distributor ① securing nut ② and withdraw distributor from rear cover.



1 Ignition distributor
2 Distributbr securing nut

ENGINE UNIT

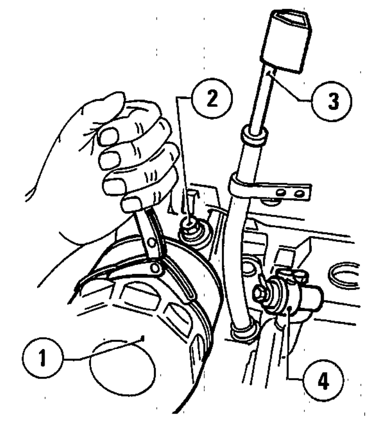
The engine is on the stand without inlet manifold and with no spark plugs, cables, and distributor cap already removed on engine removal.

1. Removal of injection wiring
(1) Disconnect injection wiring connectors from following components:
- supplementary air valve
- power module on ignition temperature
- engine water temperature sensor
- Injectors

Disengage wiring from wire clips and remove wiring from engine

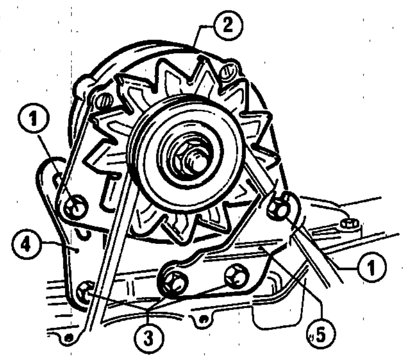
2. Remove fuel distribution manifold.
(1) Unscrew fixing screws from bracket ① supporting damper ② and pressure gauge ③
(2) Unscrew screws (two per side) fixing bradkefs ⑤ which support the fuel hose ⑦.
(3) Remove fuel hose disconnecting it from four injectors ⑥.
(4) Remove four injectors ⑥, extracting them from thermal switches ④.

3. Sequentially remove the following parts:
- Oil filter ① using suitable spanner.
- Dipstick ③ for minimum oil pressure check
- Thermal switch ④ from right cylinder head.



1 Oil filter
2 Pressure switch
3 Dipstick
4 Thermal switch

5. Remove alternator.
(1) Loosen securing bolts ① fixing alternator ② and remove drive belt.
(2) Remove bolts and take out alternator (2).
(3) Unscrew screws ③ and remove bracket ④ and ⑤.



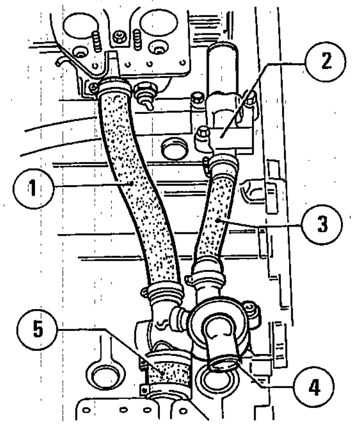
1 Bolt
2 Alternator
3 Screws
4 Bracket
5 Bracket

6. Remove sleeve and cooling system union.

(1) Loosen clamps fixing following cooling system hoses:

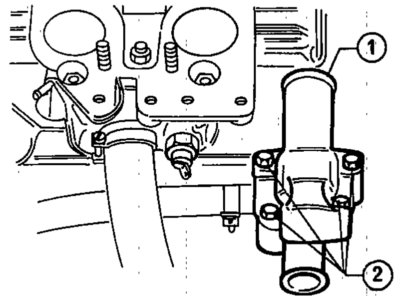
- Hose ⑤ connecting between thermostat and union ②
- Hose ③ connecting between thermostat and union ②
- Hose ① connecting thermostat and right manifold.

(2) Remove hose ③ and ①.



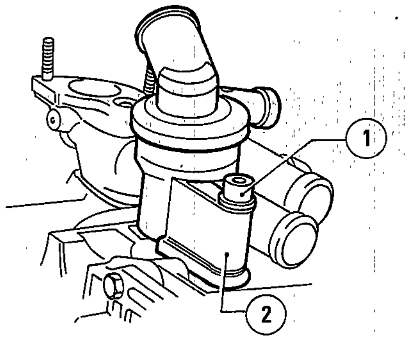
1 Hose connecting thermostat-union
2 Un~ion
3 Hose connecting thermostat-union
4 Thermostat
5 Hose connecting thermostat - right manifold

(3) Unscrew and take out screws ② fixing union ① on cylinder block, then remove union.



1 Union
2 Screws

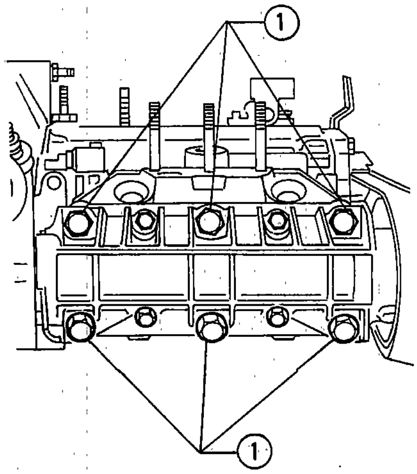
7. Remove thermostat.
Remove screw ① fixing thermostat ② on cylinder block and remove it.



1 Screw
2 Thermostat

8. Remove intake manifolds
(1) Unscrew all three nuts securing each intake manifold and remove them from heads with relevant gaskets.
(2) If necessary, remove water temperature transmitters from intake manifolds.
(3) If necessary, working on bench, unscrew the two fixing screws and remove supplementary air solenoid valve from right manifold.

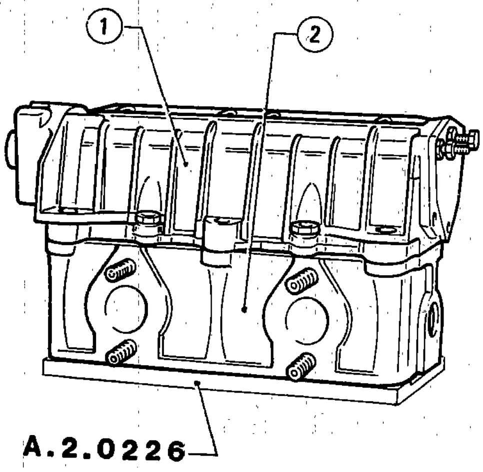
9. Proceed as per **Alfa 33** from step 11 to end, but for step 21 "Remove Cylinder Heads", which should be modified as follows:
(1) Unscrew the six screws ① which secure cylinder heads to engine block.
(2) Remove heads along with camshaft Supports and the gaskets on engine bldck.



1 Screws securing heads and camshafi supports to engine block

CYLINDER HEADS

Procedure is as per **Alfa 33** i n g into account that camshaft supports have no cover. Therefore, on head supports disassembly, recover the oil still present in the supports.



1 Camshaft support
2 Cylinder head

CHECKS AND INSPECTIONS

These procedures are for electronic injection 1.7 engines with catalytic convertor only

WARNING
Procedures described for Alfa 33 are still valid except for what follows.
For technical data of 1.7 injection engine, please refer to "Service Data and Specifications".

CYLINDER HEADS AND VALVES

As per Alfa 33 except

CUPS

1. Check that outside surface of cup is free of any trace of sizing, etching, or unusual wear.

2. Check fhat the cups upper plane on which cams work is free of unusual wear.

ENGINE ASSEMBLY

These procedures are for electronic injection 1.7 engines with catalytic convertor only

WARNING
Procedures described for Alfa 33 are still valid 'but 'for what stated here below.
For technical data of 1.7 injection engine, please refer to "Service Data and Specifications".

WARNINGS

1. Lubricate, with engine oil bearings and slipping surfaces before assembly.
2. Use new gaskets, seal rings and lock rings!.
3. Screw sprews' and nuts to specified tightening torque.
4. Apply specified sealant to components listed here below.

- Oil sump, block side
  Mastics class: 3522-00040
  DOW CORNING Silastick 732 RTV
- Water tubes, plugs, caps, cylinder heads and block.
  Mastic class 3524-00011
  Loctite 601 (green)

Before applying 'sealants eliminate any possible trace of old sealants by degreasing the surfaces.

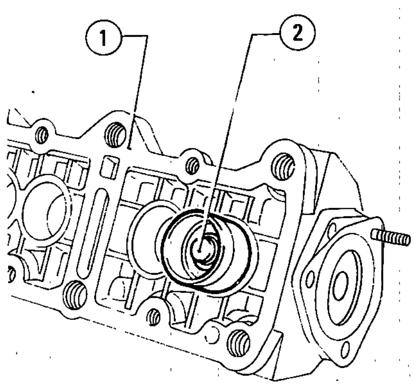
CYLINDER HEAD

Operate as stated per Alfa 33 taking into account the following:

— Lubricate thoroughly cups ② before inserting them into camshaft support ① seats.
— On reassembly of camshaft support on head, make sure the camshaft is in rest position (no cam engaged; valves closed).
— Secure camshaft support to head with gasket between tightening the four nuts in crosswise order to the temporay torque specified.

Ⓣ : **Temporarytightening, torque**
Nuts securing camshaft supports to cylinder head
10 ÷ 15 N·m
(1 ÷ 1.5 Kg·m)

— Before fitting rear cover onto support, insert 0.10 ÷ 0.15 l engine oil into support' itself.



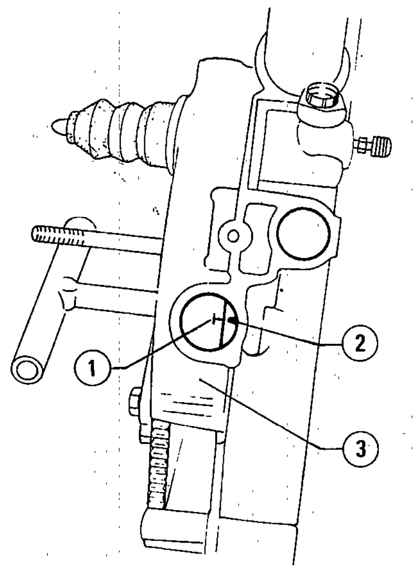
1 Camshaft
2 Hydraulic tappets cup

ENGINE, UNIT

As per Alfa 33 but modifying the mentioned steps.

- Step 15.
  Install cylinder heads

(1) Turn crankshaft till the piston in No. 1 cylinder is set at Top Dead Center in the explosion. stroke; this correct positioning is further ensured by the "T" notch ① on the flywheel matching with the reference ② on the rear cover ③.



1 "T" notch
2 Reference
3 Cylinder block rear cover

(2) Set the camshaft in rest position (no cam engaged; valves closed).

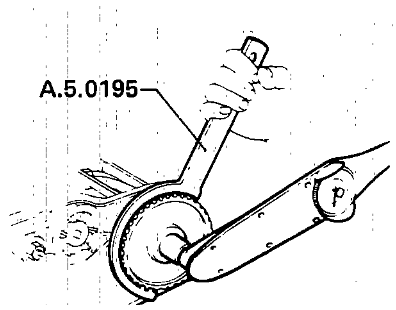
(3) Fit the cylinder heads with crankshaft support on the cylinder block, and insert the appropriate gasket.

Proceed as per Alfa 33 from Step (4).

- Step 18.
  Install timing belts.

(1) Fit camshaft drive pulleys and tighten the retaining screw to specified torque being caeeful, at the same time, to stop pulley rotation by means of toothed spanner **A.5.0195.**

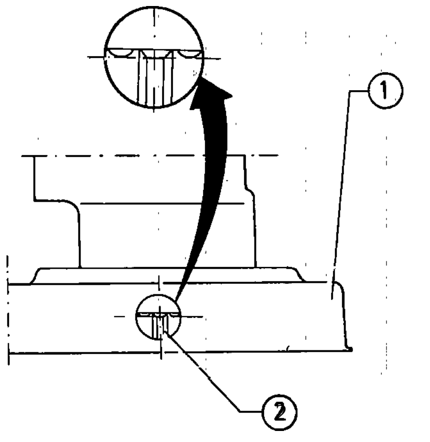
Ⓣ : Tightening torque Camshaft pulley retaining screw.
83 ÷ 70 **N·m**
(6.4 ÷ 7.1 **Kg·m)**



(2) Verify that the crankshaft's angular position corresponds to the Top Dead Center of cylinder No. 1, in the explosion stroke (alignment between notch "T" on flywheel and rear cover reference mark).

(3) Rotate crankshati counterclockwise (seen from rear side) by 45° in order to move piston of cylinder No. 2 backwards so as to prevent valves striking against piston during camshaft rotation.

(4) Position the left camshaft so that the topth and the two adjacent milled grooves of the left timing pulley are visible through the appropriate hole on rear guard ①.



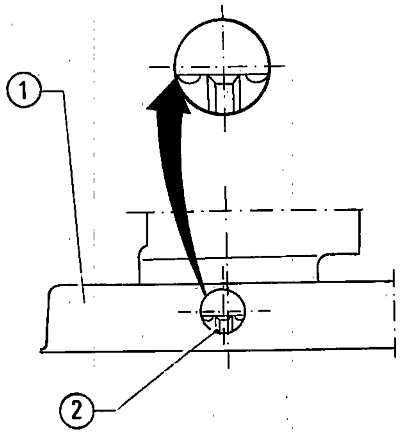
1 Timing belt rear cover
2 Left timing pulley

(5) Realign notch "T" on flywheel with the fixed reference mark (piston of cylinder No. 1 at T.D.C. in the explosion stroke) and, keeping shafts in this position, fit the left timing belt cinto pulleys.

The belt shall be fitted with its dragging side, opposed to straighteners, under tension.

(6) Loosen the nut securing the belt straightener so that it can exert the spring load on the belt.
(7) Rotate the crankshati 45° to move piston of cylinder No. 1 backwards so as to prevent valves striking against piston itself when positioning the camshaft.
(6) Position the right-hand camshaft so that the tooth and the two adjacent milled grooves of right-hand timing pulley are visible through the appropriate hole on rear guard ①; then bring the crankshaft back in the position, indicated in Step (2) and fit the timing belt onto pulleys.

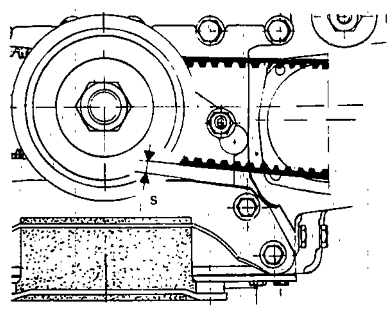
CAUTION:
Pulley tends to rotate with respect to correct position since camshaft interacts with the intake valve of cylinder No. 3. For this reason, use appropriate wrench A.5.0195 in order to keep the pulley in the correct position for belt installation.



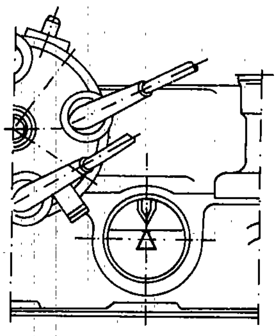
1 Timing belt rear guard
2 Right-hand timing pulley

(9) Verify that distance "S" between timing belt and contour of engine front support is not less than the minimum value prescribed.

Minimum distance "S" between timing belt and engine front support:
9 mm



(11) Rotate crankshaft in the functioning direction so as to permit belts to assume their final position.
(12) Rqtate crankshaft until piston of cylinder No. 1 is at its T.D.C. in the explosion stroke. (Notch "T" on flywheel aligned with reference mark). Then, further rotate the crankshaft counterclockwise (seen from rear side) until notch ∇ on flywheel is aligned with the reference mark (right-hand camshaft in rest position, no cam engaged).



(13) Loosen the nut of right-hand belt straightener, then tighten it to the prescribed torque,

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CAUTION:
During this operation, do not press **the** belt'straightener to prevent **alter**ing the **load** envisaged for belt straightener **itself.**

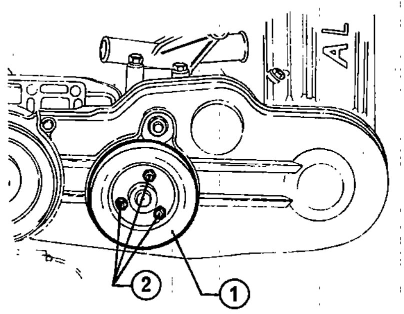
Ⓣ : Tightening, torque
Nut securing belt straightener (on cold engine)
37 ÷ 46 N·m
(3.8 ÷ 4.7 Kg·m)

(14) Starting from the position corresponding to notch V on flywheel, rotate the, crankshaft one complete revolution in the counterclockwise direction (seen from rear side) until notch V is realigned with the reference mark (left-hand camshaft in rest position; no cam engaged).
(15) Repeat Step (13) for the left-hand belt stnaightener.
(16) At the end of operations, recheck the correspondence of timing reference marks on pulleys with the appropriate holes on timing belts rear guards and with notch "T" on flywheel, aligned with the reference mark.

Proceed as per **Alfa 33** *up to Step 20 included, then complete reassembly operating as stated below.*

21. Fit front plastic covers of timing belts.

22. Mount pulley ① on pump hub andtighten it with screws ②.



1 Cooling fluid pump pulley
2 Screws

23. Screw onto block, pressure switch to signal minimum oil pressure, tightening it to specified torque.

Ⓣ : Tightening torque
Pressure switch
33 ÷ 41 N·m
(3.4 ÷ 4.2 Kg·m)

24 Fit intake manifold.
(1) If you previously removed it, fit supplementary air solenoid valve on right intake manifold.
(2) Insert intake manifolds complete with new gaskets on stud of two heads, then fix them with associated nuts.

Ⓣ : Tightening torque
Nuts securing intake manifolds
19 ÷ 24 N·m
(1.9 ÷ 2.4 Kg·m)

25. Fit the union, temperature senders, thermal switch and thermostat!
(1) Fit union on block, tightening screws on intake manifolds.

Ⓣ : Tightening torque
Union securing screws
19 ÷ 24 N·m
(1.9 ÷ 2.4 Kg·m)

(2) Fit water temperature senders on intalte manifolds.

Ⓣ : Tightening torque
: . Water temperature sender (for temperature gauge)
33 ÷ 41 N·m
(3.4 ÷ 4.2 Kg·m)
. Water temperature sender (for injection CU). Max torque
15 N . m
(1.5 Kg·m)

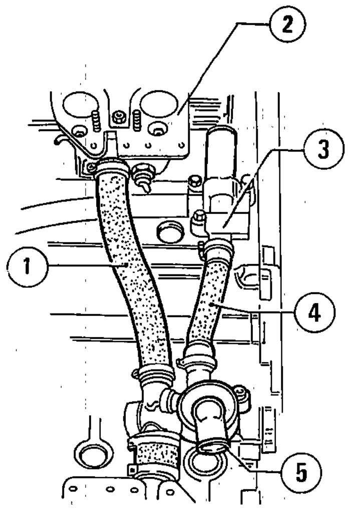
(3) Fix thermal contact on right head, tightening screwto specified torque.

Ⓣ : Tightening torque
Thermal contact screw on right head
33 ÷ 41 N-m
(3.4 ÷ 4.2 Kg·m)

(4) Connect thermostat to right intake manifold through sleeve, then fix thermostat on engine block.

26. Refit hoses of cooling system.

Mount sleeve ④ connecting thermostat ⑤ to union ③ and sleeve ① which connects thermbstat ⑤ to left intake manifold ②; tighten all screws of sleeve screwing clamps.



1 Hose
2 Left intake manifold
3 Union
4 Hose
5 Thermostat

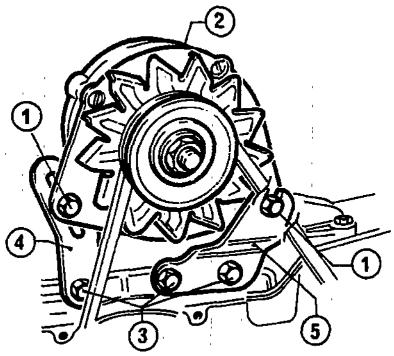
27. Fit oil filter by manually tightening it and insert dipstick.

28. By means of a suitable box spanner fit spark plugs tightening them according to specified torque.

Ⓣ : Tightening torque
Spark plugs:
25 ÷ *34* N·m
***(2.5 ÷ 3.5* Kg·m)**

29. Fit alternator and control belt.
(1) Secure bracket ④ and ⑤ to engin? front cover and tighten the two relevant screws ③.
(2) Position alternator on engine supports and tighten bolts ① without fully locking them.
(3) Key alternator and water pump drive belt on relevant pulleys.
(4) Adjust belt tension according to specified value and then lock bolts ①.

Load: 8 Kg
Arrow: 15 mm



1 Bolts
2 Alternator
3 Screws
4 Bracket
5 Bracket

30. Remount injectors on intake manifolds, replacing relevant O-rings, and fix fuel manifold.

31. Position injection wiring on engine and reconnect it to stated components:
— supplementary air solenoid valve
— **power module on** distributor
— engine **water temperature** sensor
— **injectors.**

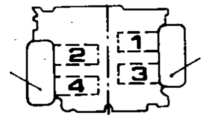
32. Fill **the engine with specified** engine oil **and** with **specified quantity.**

AGIP Sint 2000 SAE 10W/40
IP Sintiax SAE 10W/40
SHEEL Super Plus Motor Oil SAE 15W/50

Oil quantity required for **complete refill (sump, filter and oil channels):**
4.1 litre

TECHNICAL DATA

ENGINES DATA

Features \ Models	Engines with one carburetor		Engines with two carburetors			Engines with electronic injection	
	1200 * 305.85	1350 305.86	1350 305.87	1500 305.88	1700 305.50	1700 305.58	1700 305.58 Δ
Cycle	Otto 4 stroke						
Numbers of cylinders and arrangement	4 horizontally opposad						
Cylinder identification	 						
Bore - Stroke mm Displacement cm^3	80x 59 1186	80 x 67,2 1351	80 x 67.2 1351	84 x 67,2 1490	87x72 1712	87x72 1712	
Combustion chamber volume cm^3	37	42,2	39.7	44	49.5	49,5	
Compression ratio	9		9,5			9	
Power DIN Max / Specific kW (HP)	50 (68) 42 (57.3) at 6000 r.p.m.	58 (79) 43 (58,4) at 6000 r.p.m.	63 (86) 47 (64) at 6800 r.p.m.	77 (105) 51 (70) at 5600 r.p.m.	86,7 (118) 50,6 (69,8) at 6800 r.p.m.	79 (110) 46 (64) at 6800 r.p.m.	77 (105) 44,9 (61.3) at 6600 r.p.m.
Max Torque DIN N·m (Kg·m)	90 at 3200 r.p.m.	111 (11,3) at 3600 r.p.m.	119 (12,1) at 4000 r.p.m.	133 (13.6) at 4000 r.p.m.	148 (15) at 3600 r.p.m.	148 (15,4) at 4600 r.p.m.	145 (15,2) at 4600 r.p.m.
Piston mean speed (1) m/s	11,8	13,4	13		14,4		
Cylinder compression (2) kPa (bar; Kg/cm^2) Min. pressure Max difference in pression between cylinders	1029.6 (10,3; 10,5) 98 (0,98; 1)						
Oil pressura (3) kPa (bar); kg/cm^2) — **min on idle** r.p.m. — min on max r.p.m. — max on idle r.p.m.	117.68 ÷ 274.60 (1,18 ÷ 2,75; 1,2 ÷ 2,8) 411.89 ÷ 568,81 (4.12 ÷ 5.69; 4,2 ÷ 5,8)				196 (1,96; 2) 441 (4,41; 4,5) 490 (4,90; 5.0)		

(1) At max power output rpm.

(2) Values to be read in these conditions:
- engine at operating temperature
- fully opened throttles
- engine cranked by starter motor, sparking plugs removed

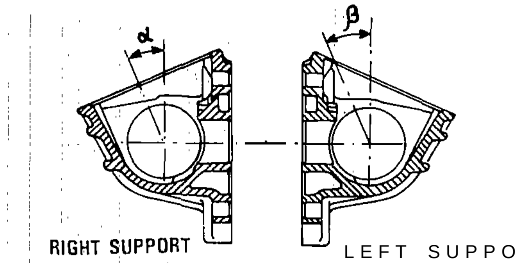
(3) Values to be read at engine operating temperature (oil at 90°C = 194°F)

(*) Not marketed in all countries

(Δ) For countries where antipollution regulations are in force.

INSPECTION AND ADJUSTMENT

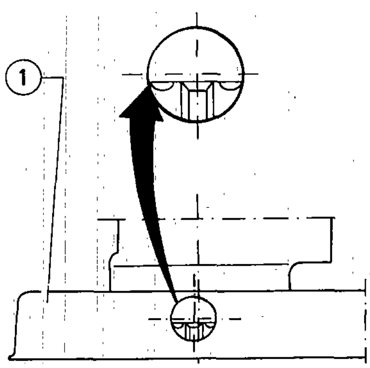
CAMSHAFT SYSTEM



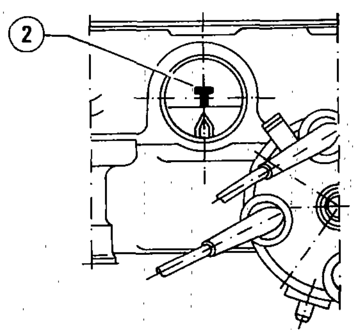
Unit: mm (in)

		Single carburetor ***engines***		Double carburetor ***engines***	
		1200 * 3g5.85	1350 305.86	1350 305.87	1500 305.88
Camshaft		545.766		546.232	
Tappet clearance	Intake	035 ÷ 0,40			
	Exhaust	0.45 ÷ 0.50			
Value of timing marks on camshaft supports	Right support	23°			
	Left support	23°			

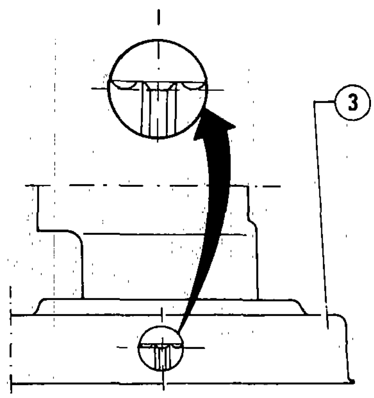
* Not marketed in all countries
All values are with engine cold



1 Rear guard for right - hand timing belt



2 T-shaped notch on flywheel



3 Rear guard for left - hand timing belt

Unit: mm (in)

		Double carburetors **engines**	Electronic injection angines	
		1700 305.50	1700 305.58	1700 Δ 305.58
Camshaft		‘580.429	581.191	549.315
Tappet clearance	Intake	0 (*)		
	Exhaust	0 (*)		
Camshafi pulley alignment reference position (with T-shaped notoh on flywheel aligned with the reference mark on engine rear cover, with the piston of cylinder No. 1 at T.D.C., in the explosion stroke).	right-hand pulley	(**)		
	left-hand pulley	(***)		

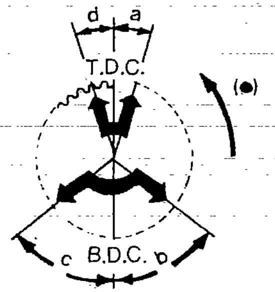
A ‘For countries where antipollution regulations are in force

(*) Engine with hydraulic tappets (with take-up of slack)

(**) Tooth with two ..ıed grooves on right-hand camshafi pulley, in correspondence with the related hole on rear guard ① of timing pulley.

(* . *) Tooth with two milled grooves on the left-hand camshaft pulley in correspondence with the related hole on rear guard ③ of timing pulley.

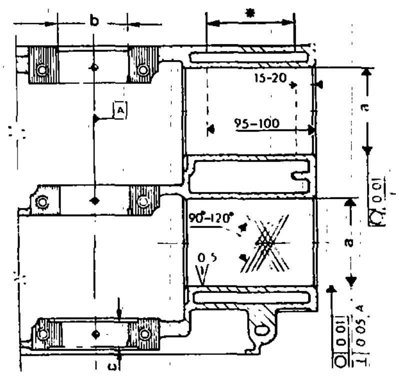
CHECKING VALVE OPENING AND CLOSING ANGLES



			Engines with one carburetor		Engines with two carburetors			Engines with electronic injection	
			1200 * 305.85	1350 305.86	1350 305.87	1500 305.88	1700 305.50	1700 305.58	1700 305.58 △
Intake	Valve clearance for checking	mm (in)	0,7				0		
	Opening BTDC	a	12°		19°		54°	30°	34°
	Closing ABDC	b	48°		53°		84°	84°	79°
Exhaust	Valve clearance for checking	mm (in)	0,7				0		
	Opening BBDC	c	45°				60° 30′	68°	64°
	Closing ATDC	d	7°		11°		50°	34°	35°

△ For countries where antipollution regulations are in force
(●) Crankshaft rotation ACW seen from flywheel side.
(*) Not marketed in all countries.

CYLINDER BLOCK

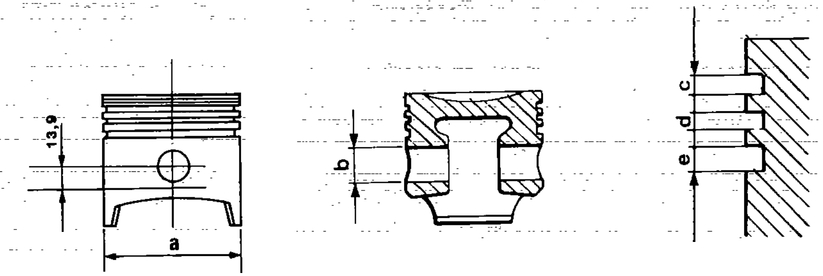


(•) Area for dimension check

Unit: mm

Inspection data			Engines		
			1200*-1350 305.85186187	1500 305.8%	1700 305.50-305.58
Cylinder bore "a"	Standard	Glass A	80,00 ÷ 80,01	84,00 ÷ 84.01	87,000 ÷ 87,010
		Class B	80.01 ÷ 80,02	84.01 ÷ 84.02	87,010 ÷ 87,020
		Class C	60.02 ÷ 80,03	84,02 ÷ 84,03	87,020 ÷ 87,030
		Class D	80.03 ÷ 80,04	84.03 ÷ 84,04	87,030 ÷ 87,040
		Class E	80,04 ÷ 80,05	84,04 ÷ 84,05	87,040 ÷ 87,050
	Oversize	1st	80,20 ÷ 80.21	84,20 ÷ 84,21	87,200 ÷ 87,210
		2nd	80,40 ÷ 80,41	84,40 ÷ 84,41	87,400 ÷ 87,410
		3rd	80,60 ÷ 80,61	84,60 ÷ 84,61	87,600 ÷ 87,610
Out-of-square between cylinder bore centreline and centreline of main bearings			0,05		
Taper and out-of-round limit		Standard	0.01		
		Max	0,02		
Cylinder bore surface roughness			(0,541) ·10^{-3}		
Cylinder bore grinding angle			90° ÷ 120°		
Main bearing diameter "b"		Front Rear	63,663 ÷ 63,673		
		Central	63,673 ÷ 63,683		
Width of rear main bearing support "c"			23.68 ÷ 23,73		

(*) Not marketed in all countries.

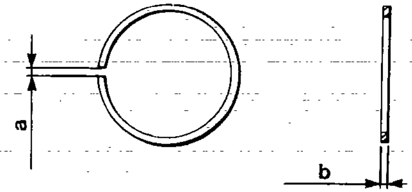


Unit: mm (in)

Inspection data			ENGINES 1200-1350 305.85 (1) 305.86 (2-3) 305.87 (2-3)	1500 305.88 (3-4)	1700 305.50 (5-6) 305.58 (5-6) Pistone Borgo	1700 Pistone Mondial	1700 A 305.58 (6)
Piston diameter "a" (1) (To be measured at right angles to the piston pin hole centre line and at height "H" from that centre line)	Standard	Class A (Blue)	79,960 ÷ 79,970	83,960 ÷ 83,970	86,960 ÷ 86,970	86,950 ÷ 86,960	86,950 ÷ 86,960
		Class B (Pink)	79,970 ÷ 79,980	83.970 ÷ 83,980	86,970 ÷ 86,980	86,960 ÷ 86,970	86,960 ÷ 86,970
		Class C (Green)	79,980 ÷ 79,990	83,980 ÷ 83,990	86,980 ÷ 86,990	86,970 ÷ 86,980	86,970 ÷ 96,980
		Class D (Yellow)	79,990 ÷ 80,000	83.990 ÷ 84,000	86,990 ÷ 87,000	86,980 ÷ 86,990	86,980 ÷ 86,990
		Class E (White)	80,000 ÷ 80,010	84,000 ÷ 84,010	87,000 ÷ 87,010	86,990 ÷ 87,000	86,990 ÷ 87,000
	Oversize	1st	80,154 ÷ 80,170	84,154 ÷ 84,170	87,150 ÷ 87,170	87,144 ÷ 87,160	87,144 ÷ 87,160
		2nd	80,354 ÷ 80,370	84,354 ÷ 84,370	87,350 ÷ 87,370	87,344 ÷ 87,360	87,344 ÷ 87,360
		3rd	80,554 t-80.570	84,554 ÷ 84,570	87,550 ÷ 87,570	87,544 ÷ 87,560	87,544 ÷ 87,560
First compression ring groove height "c"			1,525 ÷ 1,545		1,515 ÷ 1,535	1,535 ÷ 1,555	1,535 ÷ 1,555
Second compression ring groove height "d"			1,775 ÷ 1,795		1,775 ÷ 1,795		
Oil scraper ring groove height "e"			4,015 ÷ 4,035		3,015 ÷ 3,035		
Pin seat bore "b"			21,004 ÷ 21,008				

A For countries vvhere antipollution regulations are in force

(1) H = 7.6 mm MONDIAL Piston
(2) H = 11,7 mm " "
(3) H = 16.5 mm BORGO "
(4) H = 15.5 mm " "
(5) H = 6,0 mm " "
(6) H = 13.9 mm MONDIAL "



Unit: mm (in)

Inspection data		Engines			
		1200 * 305.85	1350 305.86 - 305.87	1500 305.88	1700 305.50-305-305.58
Ring thickness "b"	First compression ring	1,478 ÷ 1,490			1,478 ÷ 1,490
	Second compression ring	1,728 ÷ 1,740			1,728 ÷ 1,740
	Oil scraper ring	3,978 ÷ 3,990			2,978 ÷ 2,990
Ring gap "a" (1)	First compression ring	0,30 ÷ 0.45		0,30 ÷ 045 (2) 0,30 ÷ 0,50 (3)	0,30 ÷ 0.50
	Second compression ring,	0,30 ÷ 0,45		0,30 ÷ 0,45 (2) 0.30 ÷ 0,50 (3)	0,30 ÷ 0,50
	Oil scraper ring	0,25 ÷ 0,40		0,25 ÷ 0,40 (2) 0.25 ÷ 0,50 (3)	0,25 ÷ 0,50
	Limit gap for each ring	1			

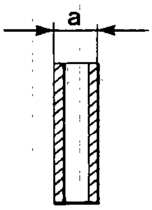
(1) To be measured inside the cylinder bore or inside a ring gauge

(2) Borgo ring

(3) Gostze ring

(*) Not marketed in all countries

Pin



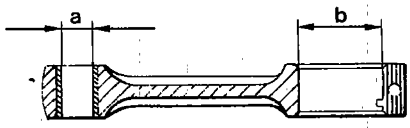
Unit: mm (in)

Inspection data	Engines			
	1200 * 305.85	1350 305.86 - 305.87	1500 305.88	1700 305.50 - 305.58
Pin diameter "a"	20,996 ÷ 21,000			
Pin-piston slack	0,004 ÷ 0,12			

(*) Not marketed in all countries

CONNECTING ROD AND CONNECTING ROD BEARINGS

Connecting rod (1)

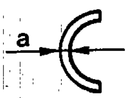


Unit: mm (in)

Inspection data	Engines			
	1200 * 305.85	1350 305.86/87	1500 305.88	1700 305.50/58
Small end bush bore diameter "a"	21,007 ÷ 21,015			
Big end bore diametar "b"	52,696 ÷ 53,708			

Connecting rod bearings

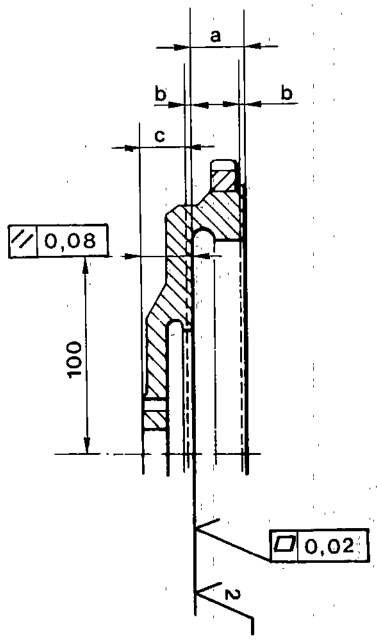
Unit: mm (in)

Inspection data			Engines			
			1200 * 305.85	1350 305.86/87	1500 305.88	1700 305.50/58
 a Connecting rod bearing thickness "a"	Standard		Blue 1,831 ÷ 1,835 Red 1,827 ÷ 1,831	Blue 1,830 ÷ 1,836 Red 1,826 ÷ 1,832		
	Oversize	1st	1,956 ÷ 1,962			
		2nd	2,083 ÷ 2,089			
		3rd	2,210 ÷ 2,216			
		4th	2,337 ÷ 2,343			

(1) If the connecting rods are completely removed, usa post-modificatin ones (Std No. 542 128)
If the connecting rods are partially replaced it is still possible to mount pre-modification ones (Std. No. 535.022)

(*) Not marketed in all countries

FLYWHEEL



Unit: m (in)

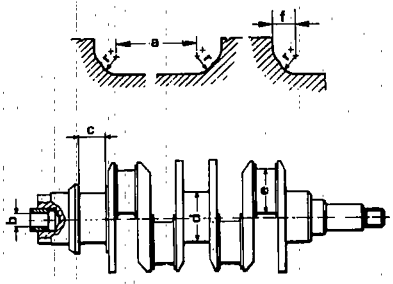
Inspection data		Engine			
		1200 * 305.85	1350 305.86/87	a 500 305.88	1700 305.50/58
Regrinding dimensions (1)	a	24,0 ÷ 24.2			
	b	⩽ 0.2			
	c	⩾ 20.95			
Parallelism of the'driven plate contact face compared with flywheel-to-crankshaft support face (as read et a 108 mm (3.94 in) radius)		0,08			
Maximum out-of-flat of driven plate contact face		0.02			
Surface roughness of driven plate contact face		$2 \cdot 10^{-3}$			

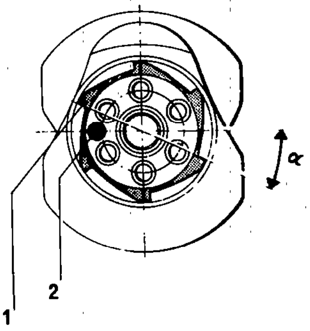
(1) The quamtity of material removed by grinding dimension "b", must be the same both on clutch driven plate contact face and on the face of the register for the clutch cover, so that dimension "a" is kept constant., Dimension "c" must not be lower than the specified lit-oit.

(*) Not marketed in all countries

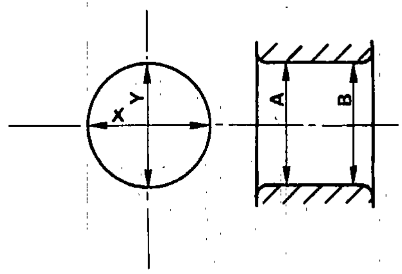
CRANKSHAFT, THRUST RINGS AND MAIN BEARINGS

Crankshaft





1 Flywheel locating dowel
2 Gear tooth beginning line



Out of. round X – Y

Taper A - B

Unit: mm (in)

Inspection date			Engine 1200 * 305.85	Engine 1'350 305.86187	Engine 1500 305.88	Engine 1700 305.50/58
Main journal diameter "d"	Standard		59,944 ÷ 59,957			
	Undersize	1st	59,690 ÷ 59,703			
		2nd	59,436 ÷ 59,449			
		3rd	59,182 ÷ 59,195			
		4th	58,928 ÷ 58,941			
Crank pin diameter "e"	Standard	Blue	49,984 ÷ 49,992			
		Red	49,992 ÷ 50,000			
	Unders'ize	1st	49,733 ÷ 49,746			
		2nd	49,479 ÷ 49,492			
		3rd	49,225 ÷ 49,238			
		4th	48,971 ÷ 48,984			
Rear main journal length "c"	Standard		28.51 ÷ 28.55			
	Oversize		28,764 ÷ 28,804 (1)			
Fillet tadii "r"	Front and central main journals		1,8 ÷ 2			
	Rear main journal		1,5 ÷ 1,7			
	Crank pins		2.8 ÷ 3			
Length of fillet radli portions "f"	;Front main journals		2,11 ÷ 2.81			
Length of parallel portion "a"	Central main journal		24.05 ÷ 24.15			
	Rear main journal		24.22 ÷ 24,32			
Surface roughness of main journals and crankpin			$0,16 \cdot 10^{-3}$			
X-Y Ovality and limit for taper A-B of main' journals and crankpins	Standard		0,006			
	Maximum		0,020			
Max. error of parallelism between crankpins and,main journals			0,015			
Max. misalignment among main journals			0.02			
			0.25			

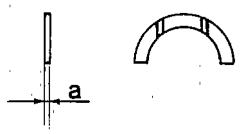
(*) Not marketed in all countries

Unit: mm (in)

Inspection data	Engine			
	1200 * 305.85	1350 305.86/87	1500 305.88	1700 305.50/58
Max. miialignment betwaen tha centrelines of the Mo pairs of crankpins and the journals centreline	0.03			
Rear crankshaft bush diameter "b"	16,065 ÷ 16,080			
Fitment of rear crankshaft gear "a" (distributor/oil pump drive)	22° ÷ 26°			

(1) Re-cutting equally spaced on both shoulders

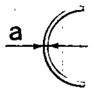
Thrust rings



Unit: mm (in)

Inspection data		Engine			
		1200 * 305.85	1350 305.86/87	1500 305.88	1700 305.50/58
Thickness "a"	Standard	2,310 ÷ 2,362			
	Oversize	2,437 ÷ 2,489			

Main bearings



Unit: mm (in)

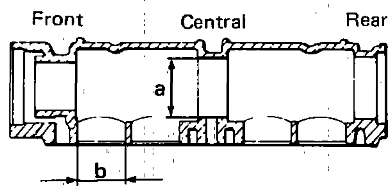
Inspection data			Engine			
			1200 * 305.85	1350 305.86/87	1500 305.88	1700 305.50/58
Thickness "a"	Standard		1,832 ÷ 1,841			
	Oversize	1st	1,959 ÷ 1,968			
		2nd	2,086 ÷ 2,095			
		3rd	2.27 3 ÷ 2,222			
		4th	2,340 ÷ 2,349			

(*) Not marketed in all countries

CAMSHAFT SUPPORT, CAMSHAFT AND TAPPET BUCKET

Camshaft support and tappet bucket

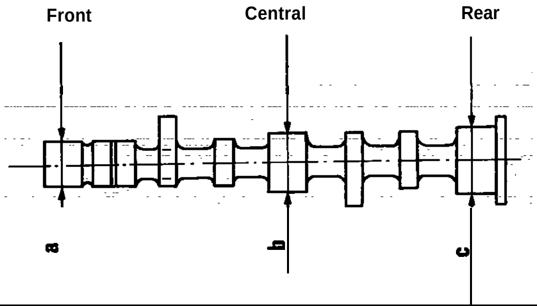




Unit: mm (in)

		Engine			
		1200 * 305.85	1350 305.86/87	1500 305.88	1700 305.50/58
Bore of camshaft journal bearing diameter "a"	Front	35,015 ÷35,040			35,015 ÷ 35,040
	Central	46,500 ÷ 46,525			48,000 ÷ 48,025
	Rear	47,000÷47,025			49,200÷49,225
Seat tappet bucket diameter "b"		35,006 ÷ 35,027			35,000 ÷ 35,025
Tappet bucket diameter "c"		34,975 ÷ 34,995			34,975 ÷ 34,995

(*) Not marketed in all countries



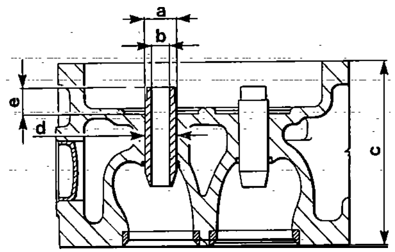
Unit: mm

Inspection data		Single carburetor engines		Double carburetor engines			Engine with electronic ignition	
		1200 * 305.85	* 1350 305.86	1350 305.87	1500 305.88	1700 305.50	1700 305.58	1700 305.58 A
Cam height	Intake	8,50				10,2	9,80	9,50
	Exhaust	8.50				9,6	9,0	8,45
Camshaft journal diameter	Front "a"	34,940 ÷ 34,962						
	Central "b"	46,440 ÷ 46,456				47.940 ÷ 47,956		
	Rear "c"	46,940 ÷ 46,956				49,140 ÷ 49,156		

(*) Not marketed in all countries

(A) For countries where antipollution regulations are in force.
(*) Not marketed in all countries

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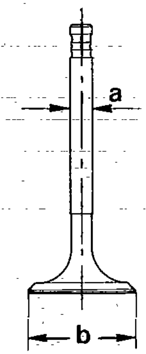


Cylinder head

Unit: mm **(in)**

Inspection data		Engine					
		1200 * 305.85	1350 305.86	1350 305.87	1500 305.88	1700 305.50	1700 305.58
Valve guide seat diameter "d"		13,000 ÷ 13,018					
Valve guide O.D. "a"	Standard	13,050 ÷ 13,068					
	Spare	13,064 ÷ 13,082					
Diameter of valve guide bore "b"		8,013 ÷ 8,031					
Diameter of saating for valve stem sealing cap. "f"		10,85 ÷ 10.95					
Valve guide protrusion "e"		9,3 ÷ 9,5					
Min. cylinder head thickness after resurfacing "c" (1)		77,676 ÷ 77,750					
Max. error of parallelism between head surfaces		0,05					
Max. out of flat on head lower surface		0,03					
Head lower surface roughness		$1.6 \cdot 10^{-3}$					

(1) Resurfacinq of cvlinder head with hemispherical combustion chamber must be done on both heads of the same engine
(*) Not marketed in all countries

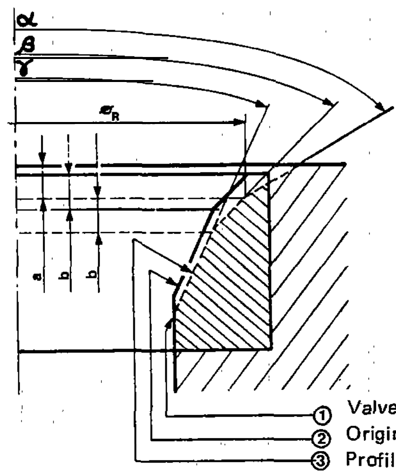


Unit: mm **(in)**

Inspection data		Engine				
		1200 * 305.85	1350 305.86	1350 305.87	1500 305.88	1700 305.50 - 305.58
Valve stem diameter "a"	Intake	7,985 ÷ 8,000				
	Exhaust	7,968 ÷ 7,983				
Valve head diameter "b"	Intake	38,00 ÷ 38.20		39,70 ÷ 39,90		
	Exhaust	33,00 ÷ 33,20				

(*) Not marketed in ail countries

VALVE SEAT RECUTTING DIMENSIONS



Unit: mm (in)

Inspection data		Engine				
		1200 * 305.85	1350 305.86	1350 305.87	1500 305.88	1700 305.50/85
Reference diameter "$Ø_R$"	Intake	37,3		39.0		
	Exhaust	31,9		31,9		
Cut limit of valve seat top surface "a"		2,9		2,9		
Cut limit of valve seat mating surface "b"	Intaka	1,07 ÷ 1,37		1.07 ÷ 1.37		
	Exhaust	1,26 ÷ 1,56		1,26 ÷ 1,56		
Valve seat top surface limit angle "a"		120°		120"		
Valve seat rnating surface limit angle "β"		90° ÷ 90° 30'		90° ÷ 90° 30		
Valve seat inner face limit angle "y"	Intake	50°		70°		
	Exhaust	30°		30°		

(*) Not marketed in all countries

FITMENT PLAYS OR INTERFERENCE FITS

Unit: mm (in)

<table>
<tr><th colspan="3" rowspan="2">inspection data</th><th colspan="3">Engine</th></tr>
<tr><th>1200-1350-1500
305.85 - 305.86 - 306.88
305.87</th><th>1700
305.50</th><th>1700
305.58</th></tr>
<tr><td rowspan="2">Cylinder bore/piston play</td><td colspan="2">Standard</td><td>0,03 ÷ 0,05</td><td>0,03 ÷ 0,05 (1)
0,04 ÷ 0,06 (2)</td><td>0,040 ÷ 0,060</td></tr>
<tr><td colspan="2">Oversize</td><td>0,03 ÷ 0,06</td><td>0.03 ÷ 0,06 (1)
0.04 ÷ 0,066 (2)</td><td>0,040 ÷ 0,066</td></tr>
<tr><td rowspan="4">Ring/groove end float</td><td colspan="2">First compression ring</td><td>0,035 ÷ 0,067</td><td>0,035 ÷ 0,057 (1)
0,045 ÷ 0,077 (2)</td><td>0,045 ÷ 0,077</td></tr>
<tr><td colspan="2">Second compression ring</td><td colspan="3">0,035 ÷ 0,067</td></tr>
<tr><td colspan="2">Oil sciaper ring</td><td colspan="3">0,025 ÷ 0,057</td></tr>
<tr><td colspan="2">Maximum for each ring</td><td colspan="3">0,1</td></tr>
<tr><td colspan="3">Pin/small end bush bore play</td><td colspan="3">0,007 ÷ 0,019</td></tr>
<tr><td colspan="3">Pin/piston bore play</td><td colspan="3">0,004 ÷ 0,012</td></tr>
<tr><td rowspan="3">Main bearing to-journal play</td><td colspan="2">Front and rear</td><td colspan="3">0,024 ÷ 0,065</td></tr>
<tr><td colspan="2">Central</td><td colspan="3">0,034 ÷ 0,075</td></tr>
<tr><td colspan="2">Maximum (with bearing in seat)</td><td colspan="3">0,1</td></tr>
<tr><td rowspan="2">Connecting rod bearing-to-crankpin play</td><td colspan="2">Standard</td><td colspan="3">Red/Blue 0,032 ÷ 0,064</td></tr>
<tr><td colspan="2">Maximum (with bearing in seat)</td><td colspan="3">0,090</td></tr>
<tr><td rowspan="2">Crankshaft end float</td><td colspan="2">Standard</td><td colspan="3">0,056 ÷ 0,25</td></tr>
<tr><td colspan="2">Max</td><td colspan="3">0,35</td></tr>
<tr><td rowspan="2">End float of big end</td><td colspan="2">Standard</td><td colspan="3">0,2 ÷ 0,392</td></tr>
<tr><td colspan="2">Max</td><td colspan="3">0,45</td></tr>
<tr><td rowspan="2">Radical clearance between camshaft and bearing</td><td colspan="2">Front</td><td>0,053 ÷ 0,100</td><td>0,020 ÷ 0,078</td><td>0,053 ÷ 0,100</td></tr>
<tr><td colspan="2">Central
Rear</td><td colspan="3">0,044 ÷ 0,085</td></tr>
<tr><td colspan="3">Camshaft end float</td><td colspan="3">0,10 ÷ 0,33</td></tr>
<tr><td rowspan="2">Radial clearance between tappet bucket and seat in camshaft support</td><td colspan="2">Standard</td><td>0,011 ÷ 0,052</td><td colspan="2">0,005 ÷ 0,05</td></tr>
<tr><td colspan="2">Max</td><td colspan="3">0,1</td></tr>
<tr><td rowspan="4">Valve stem-to guide play</td><td rowspan="2">Intake</td><td>Standard</td><td colspan="3">0,013 ÷ 0,046</td></tr>
<tr><td>Max</td><td colspan="3">0,07</td></tr>
<tr><td rowspan="2">Exhaust</td><td>Standard</td><td colspan="3">0,030 ÷ 0,063</td></tr>
<tr><td>Max</td><td colspan="3">0,09</td></tr>
<tr><td rowspan="2">Valve guide-to-seat interference fit</td><td colspan="2">Standard</td><td colspan="3">0,032 ÷ 0,068</td></tr>
<tr><td colspan="2">Spare</td><td colspan="3">0,046 ÷ 0,082</td></tr>
</table>

(1) Borgo Piston

(2) Mondial Piston

HEATING TEMPERATURES

As per Alfa 33.

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS

Unit: l (Imp. Gal)

Application	Type	Denomination	Q.ty (litres)
Engine oil sump at max level	OIL	**AGIP SINT 2000 10W40** **Std. No. 3631 - 69352**	3.5
Filter and internal piping		IP SINTIAX 10W40 Std. No. 3631 - 69353	0.6
Periodical change with filter replacement (*)		SHELL Super Plus Motor Oil 15W50	4.0

(*) Filter removal involves only the partial emptying of internal piping.

SEALING COMPOUNDS

As for Alfa 33 together with the following torques for 1.7 engines

GRINDINGS

As per Alfa 33.

TIGHTENING TORQUES

As for Alfa 33 except as follows for **1.7 engines**

Item / Measurement unit	N·m	Kg·m
Screws securing engine front cross member and anti-roll bar bracket to body	66.5 ÷ 63.3	6.6 ÷ 6.5
Screws securing anti-roll bar to strut	14.7 ÷ 23.5	1.5 ÷ 2.4
Screws connecting constant velocity joints to differential shafts	33 ÷ 36	3.4 ÷ 3.7
Coolant temperature sender for fuel injection electronic control unit	15	1.5

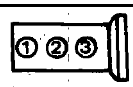
SERVICE DATA AND SPECIFICATIONS

For diesel engines only

TECHNICAL DATA

As for 33 1.8 TD except for those features listed below:

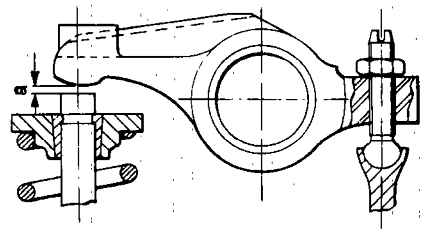
ENGINE

Features		Data
Engine type		VM 82 A
Cycle		4 - Stroka Diesel (Precombustion chamber COMET)
Number of cylinders and arrangement		3 in line
Cylinder identification		 Running direction
Bore - Stroke Displacement	mm (in) cm³ (cu. in)	92 x 89.2 (3.62 x 3.51) 1779 (108.58)
Combustion chamber volume	cm³ (cu. in)	23.2 to 24.3 (1.41 to 1.48)
Compression ratio		22 : 1
Power CEE (at 4000 r.p.m.) Maximum Specific	kW (CV) (HP)	55 (75) (73.97) (1) 30.55 (41.66)~ (41.08) (1)
Max. torque DIN (at 2400 r.p.m.)	N·m (kg·m; ft·lb)	150 (15.3; 110.63) (1)
Piston, mean speed (2)	m/s (ft/s)	11.893 (39.02)
Cylinder compression (3) Specified value Max. difference in pressure between cylinders	kPa (kg/cm²; p.s.i.)	2156 (21.56) (306.65) 98 (0.98) (13.94)
Engine oil pressure (4) At idle r.p.m. At peak r.p.m.	kPa (kg/cm²; p.s.i.)	50 (0.5; 7.11) 400 (4; 56.89) (*) 550 (5.5; 78.23) (**)

(1) Tolerance up to: — 4%
(2) At maximum power output r.p.m.
(3) Readings to be taken with engine at operating temperature driven by starter motor (140 to 160 r.p.m.)
(4) Readings to be taken with engine at operating temperature (oil at 90°C; 194°F)
(5) Min. allowable value
(6) Max. allowable value

CHECKS AND ADJUSTMENTS

TIMING DATA (1)



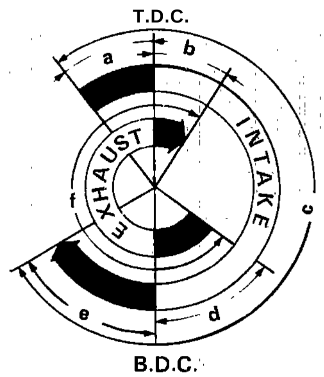
Unit: mm (in)

		Engine 1800 VM 82A
Camshaft	Alfa Romeo Part No.	129.958
Normal valve clearance "a"	Intake	0.30 (0.012)
	Exhaust	0.30 (0.012)
Normal cam lift	Intake	7.20 (0.283)
	Exhaust	7.64 (0.301)

(1) All values refer to cold engine

TIMING DIAGRAM (ANGULAR VALUES) (1)

(crankshaft clockwise rotation, viewed from front side)



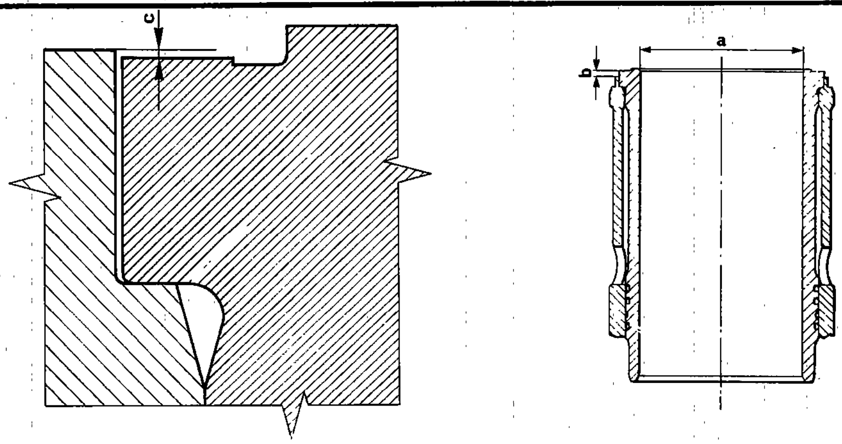
Unit: Grades

				Engine 1800 VM 82A
Normal diagrani	Intake	Opens (B.T.D.C.)	"a"	22°±5°
		Closes (A. 8. D. C.)	"e"	46°± 5°
		Intake phase angle	"c"	250°
	Exhaust	Opens (B.B.D.C.)	"d"	60°±5°
		Closes (A.T.D.C.)	"b"	24°±5°
		Exhaust phase angle	"f"	264°
Diagram for timing check	Intake	Clearance for checking	mm (in)	1.2 (0.047)
		Opens (A.T.D.C.)		3°±2°
		Closes (A.B.D.C.)		20°±3°
	Exhaust	Clearance for checking	mm (in)	1.65 (0.065)
		Opens (B.B.D.C.)		26°±3°
		Closes (B.T.D.C.)		10°±2°

(1) All values refer to cold engine

CYLINDER LINERS, COMPRESSION RINGS, GUDGEON PINS AND PISTONS

Cylinder liners

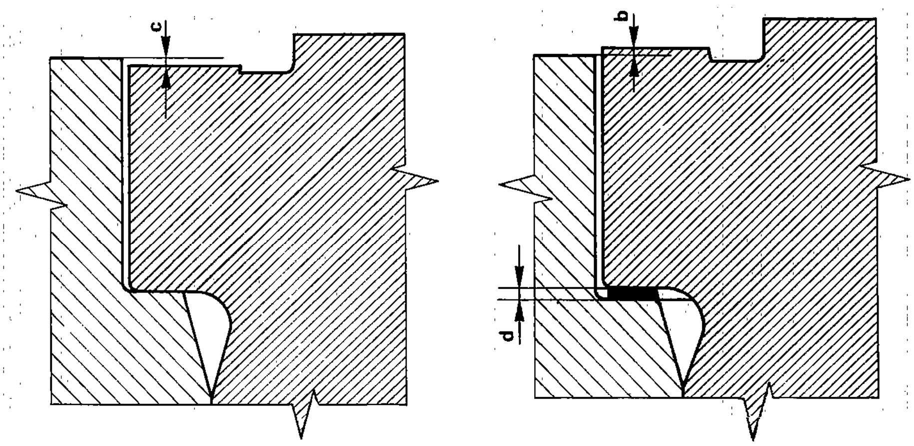


Unit: mm (in)

Inspection data		Engine 1800 VM 82A
Liner bore "a"	Grade A	92.000 to 92.010 (3.6220 to 3.6224)
Recess of cylinder liner outer rim from engine block (1) "c"		0.11 to 0.23 (0.0043 to 0.0091)
Liner stand-out "b" from engine block (1)		0.00 to 0.05 (0 to 0.0024)
Max liner ovality and taper (at wear limit)		0.010 (0.0004)
Liner inner surface roughness (new)	μm (in)	0.8 to 1.2 [(0.0315 to 0.0472)·10^{-3}]

(1) For this measurement, fit liner retaining tool A.7.0411 and tighten screws to 59 N·m (6 kg·m) (43.38 ft·lb)

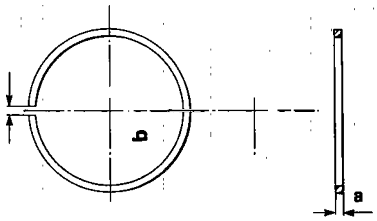
Measurement of gasket thickness between liner and engine block



Unit: mm (in)

Recess of cylinder liner outer rim from engine block "c"	Engine 1800 VM 82A Gasket "d" thickness
0.11 to 0.14 (0.0043 to 0.0055)	0.15 (0.0059)
0.15 to 0.20 (0.0059 to 0.0079)	0.20 (0.0079)
0.21 to 0.23 (0.0083 to 0.0091)	0.23 (0.0091)

Compression rings

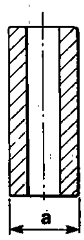


Unit: mm (in)

Inspection data		Engine 1800 VM 82A
Ring thickness "a"	1st compression ring	2.075 to 2.095 (0.0817 to 0.0825)
	2nd compression ring	1.978 to 1.990 (0.0779 to 0.0783)
	Oil scraper ring	3.978 to 3.990 (0.1566 to 0.1571)
Ring gap (1) "b"	1st compression ring	0.40 to 0.65 (0.0157 to 0.0256)
	2nd compression ring	0.25 to 0.45 (0.0098 to 0.0177)
	Oil scraper ring	0.25 to 0.58 (0.0098 to 0.0228)

(1) To be measured by ring gauge or in cylinder liner

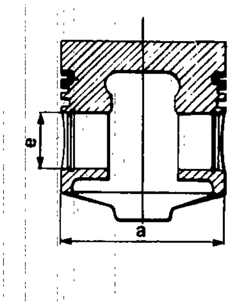
Gudgeon pins

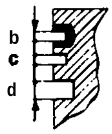


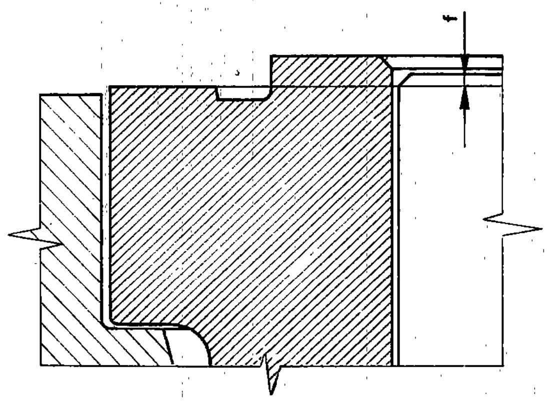
Unit: mm (in)

Inspection data	Engine 1800 VM 82A
Gudgeon pin diameter "a"	29.990 to 29.996 (1.1807 to 1.1809)

Pistons~ (with insert)







Unit: mm (in)

Inspection data		Engine 1800 VM 82A
Piston diameter (1) "a"	Grade A	91.965 to 91.975 (3.6206 to 3.6211)
1st compression ring groove height "b"		2.175 to 2.205 (0.0856 to 0.0868)
2nd compression ring groove height "c"		2.060 to 2.080 (0.0811 to 0.0819)
Oil scraper ring groove height "d"		4.020 to 4.040 (0.1583 to 0.1591)
Gudgeon pin bore dia. in piston "e"		30,002 ÷ 30,007
Max piston skirt wear limit		0.050 (0.002)
Max gudgeon pin bore ovality (at wear limit)		0.050 (0.002)

(1) To be measured perpendicularly to gudgeon pin, at 19.75 mm (0.7775 in) from lower edge of piston skirt

(2) For this measurement use special cylinder liner retaining tool A.7.0411 and tighten the screws to 59 N.m (6kg.m)

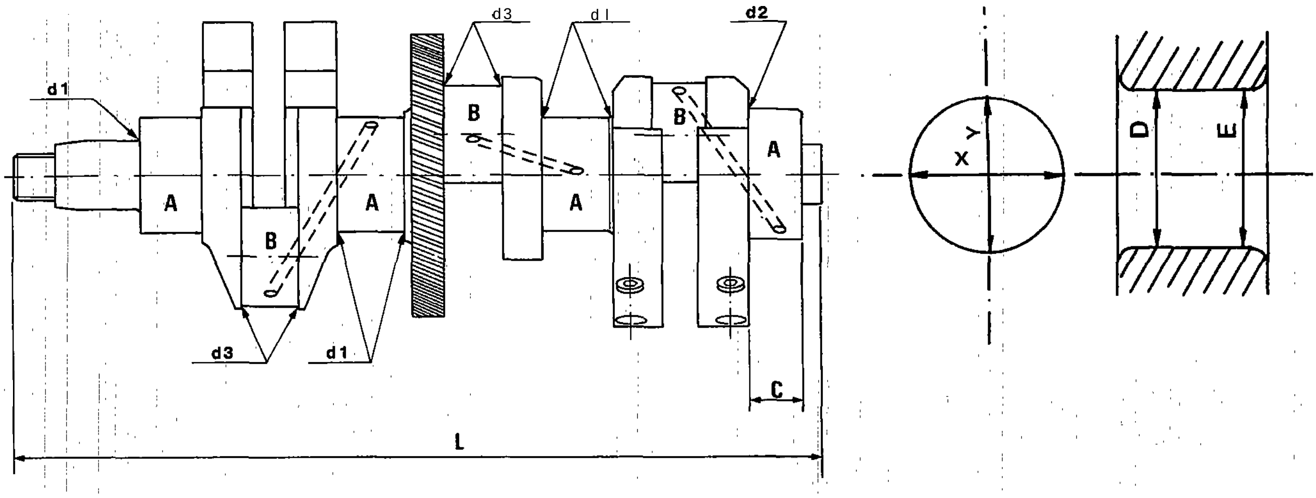
Measurement of cylinder head, gasket thickness

Unit: mm (in)

Cylinder head gasket thickness	Identification notches	Engine 1800 VM 82A — Piston projection at T.D.C. with respect to liner outer rim "f" (1)
1.420 10.0559)	0	0.480 to 0.570 (0.0189 to 0.0224)
1.520 (0.0598)	2	0.580 to 0.610 (0.0228 to 0.0264)
1.620 (0.0638)	1	0.880 to 0.770 (0.0268 to 0.0303)

CRANKSHAFT, CYLINDER BLOCK AND MAIN BEARINGS, CONNECTING RODS, BIG END BEARING AND FLYWHEEL

Crankshaft



Ovality X-Y

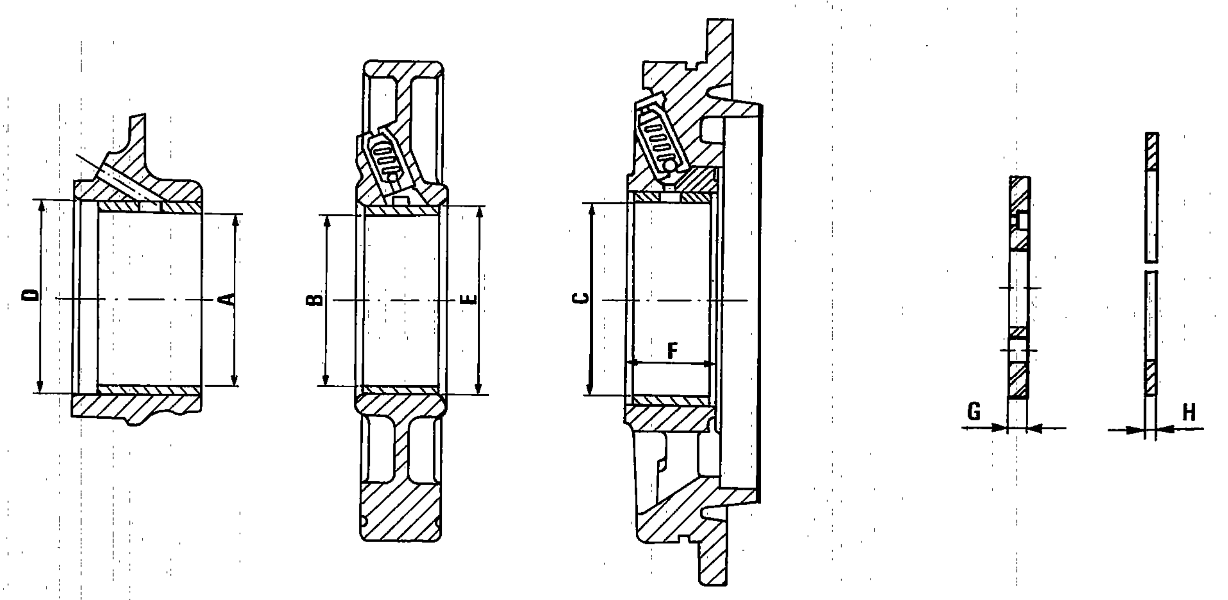
Taper D-E

Unit: mm (in)

Inspection data			Engine 1800 VM 82 A
Main journal diameter "A"	Front		62,995 ÷ 63,010
	Intermediate		63,005 ÷ 63,020
	Rear		69,985 ÷ 70,000
Crankpin diameter "B"	Standard		53,940 953,955
	Undersize	1st'	53.670 ÷ 53,690
		2nd	53,420 ÷ 53.440
Rear main journal length "C"			27,975 G-28.025
Fillets	Front and intermediate main journals	"d_1"	2.7 ÷ 3
	Rear main journals	"d_2"	2.7 ÷ 3
	Cran kpins	"d_3"	2.7 ÷ 3
Main, journal and crankpin surface roughness		μm (in)	0,12
Max. main journal and cran'kpin ovality at wear limit			0,010
Max. main journal and crankpin taper at wear limit			0.10
Max. main journal eccentricity			0.03
F;inal dimension "L"			430.5

Note: Renitride crankshaft after grinding.

Cylinder block and main bearings



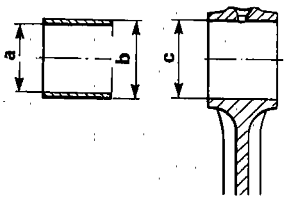
Unit: mm (in)

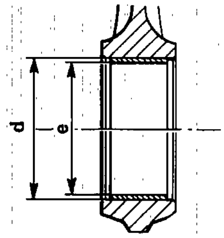
Inspection data			Engine 1800 VM 82A
Front bearing housing bore dia. "A" in engine block			67.025 to 67.050 (2.6388 to 2.6398)
Front bearing inner dia. "B" in engine block	Standard		63.060 to 63,110 (2.4826 to 2.4846)
	Undersize	1st	62.810 to 62.860 (2.4728 to 2.4748)
		2nd	62.560 to 62.610 (2.4630 to 2.4650)
Intermediate bearing housing bore dia. "C" in bearing split rings (1)			66.670 to 66.687 (2.6248 to 2.6255)
Intermediate bearing inner dia. "D" in baaring split rings (2)	Standard		63.050 to 63.093 (2.4823 to 2.4840)
	Undersize	1st	62.800 to 62.843 (2.4724 to 2.4741)
		2nd	62.550 to 62.593 (2.4626 to 2.4643)
Rear bearing inner dia. "E" in bearing split ring	Standard		70,050 ÷ 70,065
	Undersize	1st	69.800 to 69.825 (2.7480 to 2.7490)
		2nd	69.550 to 69.575 (2.7382 to 2.7392)
Rear bearing housing shoulder distance "F"			33.060 to 33.130 (1.3016 to 1.3043)
Crankshaft abutment flange thickness "G"			7.90 to 8.10 (0.3110 to 0.3189)
Shim'rings thickness "H"	Standard		2.311 to 2.362 (0.0909 to 0.0930)
	Oversize	1st	21411 to 2.462 (0.0949 to 0.0969)
		2nd	2.511 to 2.562 (0.0988 to 0.1008)

(1) For this measurement, fit linear retaining tool A.7.0411 and tighten screws to 59 N·n (6 kg·m; 43.38 ft·lb)

(2) To be measured with bearing split ring screws thightened to 39 to 44 N·m (4 to 4·5 kg·m;)

Connecting rods and big end bearings





Unit: mm (in)

Inspection data			Engine 1800 VM 82A
Connecting rod small end bearing bore "a"			30.030 to 30.045 (1.1823 to 1.1829)
Connecting rod small end bearing outside diameter "b"			34.089 to 34.129 (1.3421 to 1.3437)
Bush housing inner dia. "c" in small end			34.000 to 34.025 (1.3386 to 1.3397)
Big end inner dia. "d" (1)			57.563 to 57.582 (2.2663 to 2.2670)
Connecting rod big end bearing bore (1) "e"	Standard		53.975 to 64.014 (2.1250 to 2.1265)
	Undersize	1st	53.725 to 53.764 (2.1152 to 2.1167)
		2nd	53.475 to 53.514 (2.1053 to 2.1068)

(1) To be measured with connecting rod screws tightened to 79.4 to 84.3 N·m (8 to 8.6 kg·m; 57.84 to 62.18 ft·lb)

FITMENT PLAYS AND INTERFERENCE FITS

Unit: mm (in)

Inspection data			Engine 1800 VM 82A
Cylinder liner/piston clearance	New		0.625 to 0.045 [(0.984 to 1.772)·10^{-3}]
	Wear limit		0.5 (19.68·10^{-3})
Ring/groove end float	1 st compression ring		0.080 to 0.130 [(3.149 to 5.118)·10^{-3}]
	2nd compression ring		0.070 to 0.102 [(2.756 to 4.016)·10^{-3}]
	Oil scraper ring		0.030 to 0.062 [(1.181 to 2.441)·10^{-3}]
Pin/piston bore clearance			6,006 ÷ 0,017
Pin/small-end bush bore clearance	New		0.034 to 0.055 [(1.338 to 2.165)·10^{-3}]
	Wear limit		0.100 (3.937·10^{-3})
Main journal/bearing running clearance (new)	Rear main journal		0,050 ÷ 0,080
	Front main journal		0,050 ÷ 0,115
	Intermediate main journal		0,030 ÷ 0,088
Big-end bearing/crankpin running clearance (new)			0,022 ÷ 0,076
Main journal and crankpin/bearing running clearance (at wear limit)			0.200 (7.874·10^{-3})
Crankshaft end float			0.121 to 0.323 [(4.764 to 12.716)·10^{-3}]
Big-end end float			0120 to 0.40 [(7.874 to 15.748)·10^{-3}]
Camshaft journal/bearing runnin'g clearance	New		'0.640 toO.I10 [(1.575 to 4.331)·10^{-3}]
	Wear limit		0.200 (7.874·10^{-3})
Rocker bush/shaft running clearance	New		0.020 to 0.062 [(0.787 to 2.441)·10^{-3}]
	Wear limit		0.200 (7.874·10^{-3})
Tappet/housing running clearance	New		0.025 to 0.070 [(0.984 to 2.756)·10^{-3}]
	Wear limit		0.100 (3.937·10^{-3})
Valve stem/guide running clearance		Intake	0.640 to 0.075 [(1.575 to 2.953 ·10^{-3}]
		Exhaust	0.060 to 0.095 [(2.362 to 3.740)·10^{-3}]
Valve seat/housing interference fit		Intake	0.085 to 0.124 [(3.346 to 4.882)·10^{-3}]
		Exhaust	0.062 to 0.102 [(2.441 to 4.016)·10^{-3}]
Valve guide/housing interference fit			0.020 to 0.047 [(0.787 to 1.850)·10^{-3}]
Rotor stand-outs in oil pump			0.930 to 0.073 [(1.181 to 2.874)·10^{-3}]
Oil pump inner/outer rotor max, clearance			0.070 to 0.20 [(2.756 to 7.874)·10^{-3}]
Outer rotor/housing clearance in oil pump	New		0.130 to 0.185 [(5.118 to 7.283)·10^{-3}]
	Wear limit		0.50 (19.68·10^{-3})
Gear end float in pump body			6.05 to 0.07 [(1.968 to 2.756)·10^{-3}]

GROUP 04

CONTENTS

(*) Refer to "WORKSHOP MANUAL " VOLUMES I and II - Group 04
(•) Refer to Group 00
(••) Refer to Group 07
(A) For electronic injection 1.7 engines with catalytic converter only

DESCRIPTION

For electronic injection 1.7 engines

GENERAL DESCRIPTION

The JETRONIC LE 3.2 electronic system consists an inductive discharge transistorized injection system equipped with a control unit (CU).
The ignition, however is ensured by an electronic ignition system equipped with an electronic power module.
The data necessary for controlling the system is collected by means of sensors that transform the data into electrical signals. This data concerns:

- battery voltage
- position of the accelerator throttle (completely closed or open)
- air intake temperature
- engine coolant temperature
- quantity of air taken in by the engine
- quantity of oxygen present in the exhaust gases
- engine r.p.m. (from the distributor)

The electronic CU calculates the opening time of the electroinjectors with relation to the instantaneous r.p.m. and load condition of the engine.
Having carried out the calculation, the CU sees to the opening of the electroinjectors for this time. Since the difference between fuel pressure and air pressure in the manifold is mantained constant by a regolator, the quantity of fuel injected is proportional to the delivery time.
Furthemore the injection CU is able to carry out from time to time certain operations considered necessary under certain engine conditions (e.g. electroinjector for cold start, interruption of fuel delivery when engine is decelerating).
The injection CU also controls the delivery of the fuel p'ump.

JETRONIC LE 3.2 INJECTION SYSTEM

The system', which consists of an air system and of a fuel system includes the following:

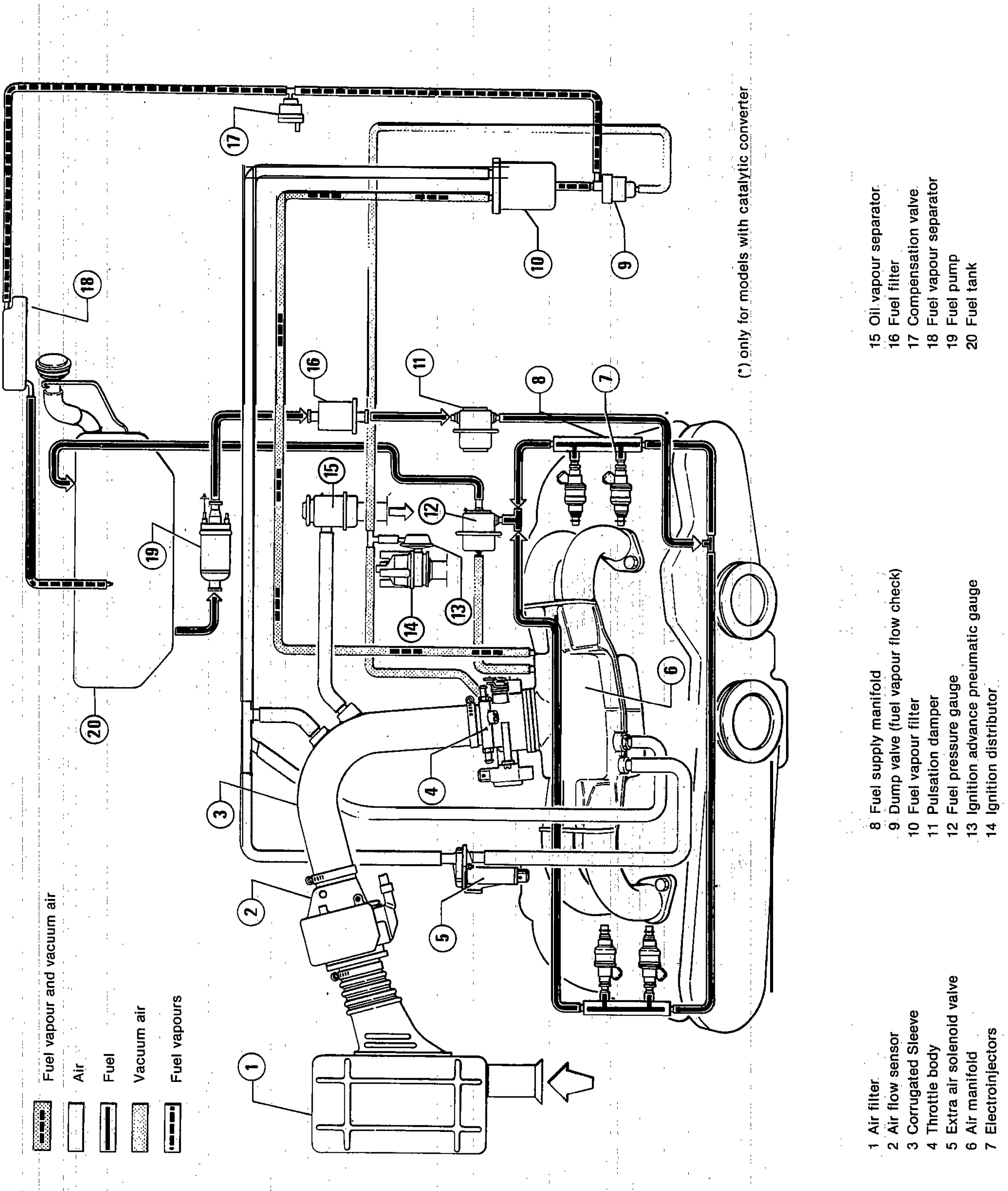
- A filter-equipped fuel pump
- a pulsation damper whose task is to eliminate pulsations due to pressure peaks
- a pressure, gauge which keeps constant pressure difference between fuel system and intake manifold
- four electroinjectors which, owing to pressure gauge, supply a fuel quantity dependent on their opening time
- an air flow sensor, which measures ait taken in by engine (adjusted in relation to air temperature)
- supplementary air solenoid valve suppliyng extra air when the engine is cold
- a switch on accelerator, throttle recognizing the two cases of open or closed throttle
- an engine Coolant temperature sensor for injection CU
- an rpm sensor
- pipes and electrical wiring, including remote control switches and CU (inserted in air flow sensor)
- a lambda probe determining oxygen differences, in exhaust gas, with respect to the air (only for models with catalytic converter).

IGNITION SYSTEM

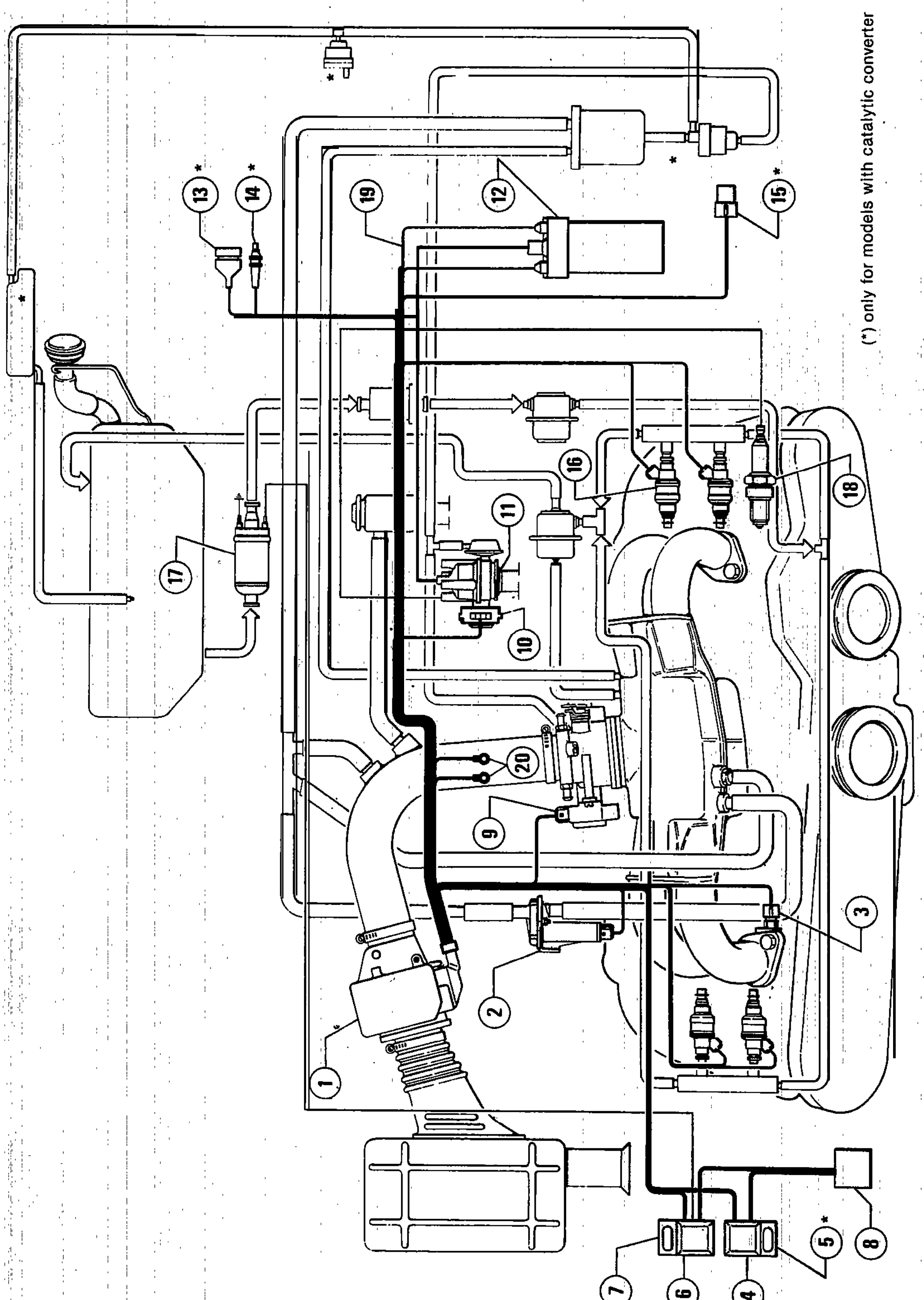
This system consists of:

- an electronic 'power module
- a high voltage shock generating coil
- a high voltage distributor supplying power to spark plugs
- four ignition spark plugs
- electrical iwiring at low and high voltage

AIR, FUEL, FUEL VAPOUR SYSTEM CHART



INJECTION SYSTEM WIRING DIAGRAM



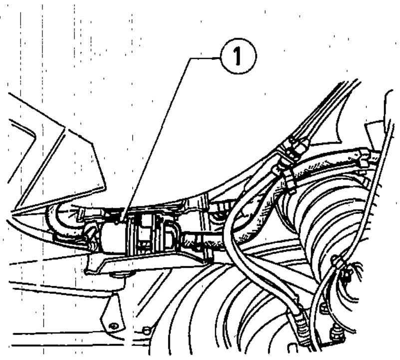
(*) only for models with catalytic converter

1 Air flow sensor/Injection CU
2 Supplementary air solenoid valve
3 Engine coolant temperature sensor
4 Main injection remote control switch
5 lambda probe resistance fuse
6 Fuel pump remote control switch
7 Fuel pump fuse
8 Vehicle wiring connection
9 Min. & Max. throttle opening switch
10 Power module
11 Ignition distributor
12 Ignition coil
13 Lambda probe resistance connector
14 Lambda probe signal connector
15 Lambda probe connector
16 Electroinjectors
17 Fuel pump
18 Spark plugs
19 Cable to detect engine rpm
20 Centralized ground
21 Ignition CU

MAIN COMPONENTS

FUEL PUMP

The pump is of the rotating type with cells and rollers, driven by an electric motor which remains immersed in the fuel under pressure downstream the pumping unit. This arrangement results in a reduction in noise and furthermore the fuel under pressure acts as a hydraulic support between the spindle and relative supporting bushes. The pump delivers more fuel than the engine effectively requires, in order to maintain effective pressure in the supply system under all possible operating conditions, If the key is inserted in the ignition and turner to the "MARCIA" (running) position, the pump is not supplied with power; when the key is turned on the "AVVIAMENTO" (starting) position, the control unit'measures the r.p.m. from ignition distributor and, when this exceeds a determined value sail control unit seessto supplying the fuel pump. Whit this electrical safety circuit, in the case of a faulty electroinjector with ingition inserted, one prevents the corrisponding circuit from being filled with 'fuel.



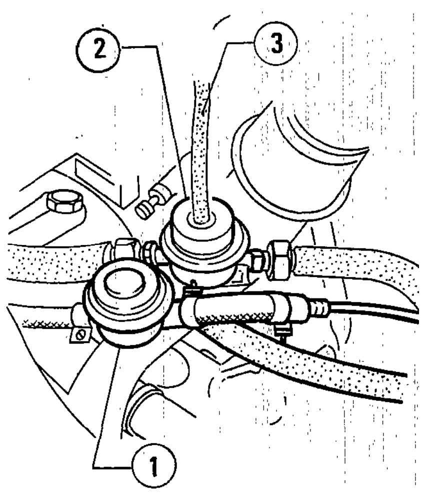
1 Fuel pump

DAMPER

The damper is connected upstream the fuei distribution tube. The function of the damper is to supress hammering that can occur especially when the engine is running on low r.p.m..
The hammering is generated by jumps in fuel pressure that arise from the opening and closing of the electroinjectors or the pressure regulator.

FUEL PRESSURE REGULATOR

The fuel under pressure enters the lower chamber of the regulator and acts on a membrane which, overcoming the action of a spring, rises togheter with a small plate and opens the passage to tank return tube. In addition to the regulating function of the spring, 'which has a fixed setting, there is also that of the vacuum pressure of the supply manifold transmitted to the re'gulator upper chamber via a hose connected to the manifold.
When this pressure from the supply manifold increases the membrane rises, opening the fuel return passage and determining an equal decrease in the fuel pressure itself. Thepurpose of this additional adjustment is to maintain the jumps in pressure between the fuel upstream the electroinjectors and the air in the manifold constant. In this way the fuel delivered depends exclusively on the opening time of the electroinjector itself. .



1 Hammering
2 Pressure regulator
3 Vacuum, tube

ELECTROINJECTORS

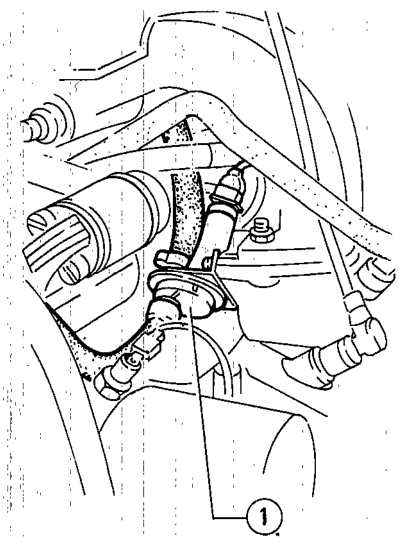
There is one electromagnetically actuated injector for each cylinder; the electroinjectors are connected electrically in parallel and inject simultaneously once for each rotation of the crankshaft half of the necessary quantity of fuel.

An electroinjector consists essentially of a coil, a moving core, a guide for the needle and the needle. The core of the moving magnet is in one piece with the needle which is pressed against the sealed seating of the body of the electroinjector by a spring. the needle of the electroinjector is opened as a result of magnetic field created by the magnet and this is effected when the electronic CU sends an appropriate electric signal.
The stroke of the moving core, and therefore of the needle, is very limited (0.15 mm approx.) as a consequence of a stop disc which has the purpose of preventing the moving core from banging against the fixed internal part.
The opening time of the needle is 2-10 ms according to the 'signal arriving from the CU. The tip of the electroinjector is fitted with a thermal insulating bushing in teflon, the purpose of which is to prevent the evaporation of the fuel and the consequent crystalisation of the dry deposit on the needle. This bushing must not therefore be'removed when fitting the electroinjector.

SUPPLEMENTARY AIR SOLENOID VALVE

The supplementary air solenoid valve determines, with the engine cold, the passage of supplementary air to the engine by means of the accelerator throtfle by-pass.
A bi-metallic lamina inside the'valve is affected by the temperature of the cy linder head in such a way as to obtain maximum closing of the by-pass when the engine is hot. In addition to this, a heater winding heats the lamina and closes the by-pass more quickly than would occur with the heating of the whole engine mass.

The purpose of the device is to give smoother engine running when the engine is cold, compensating for the greater resistances, due to friction, with an increased fuel supply.



1 Supplementary air solenoid valve

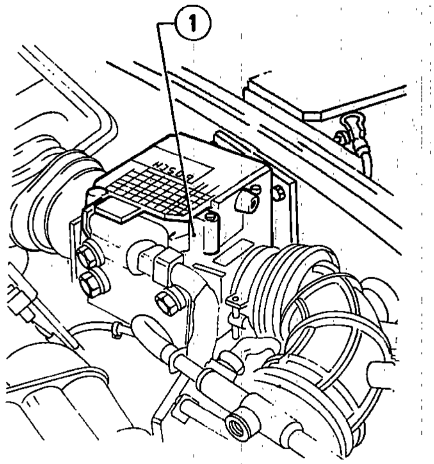
AIR FLOW SENSOR/CONTROL UNIT

The air flow sensor has the task of furnishing the electronic CU with an electric signa!, by means of a potentiometer, with relation to the air flow taken in by the engine. This signal is used by the CU to determine the duration of the injection time.

The sensitive element is a floating throttle which opens according to the amount of air taken in (a function of the engine r.p.m. and the opening of the accelerator throttle). The angular position of the floating throttle is measured by a potentiometer which is firmly fixed to the spindle of the floating throttle itself.

A compensating throttle coupled to the floating throttle compensates for any oscillations in the pressure of the flow due to backflow that may occur, so that thesd do not affect the measuring of the air flow.

A sensor for measuring the temperature of the air taken in is located at the entrance of the air flow sensor. The electronic CU for the control and monitoring of the whole injection system is loc'ated in the upper part (cover) of the air flow sensor.

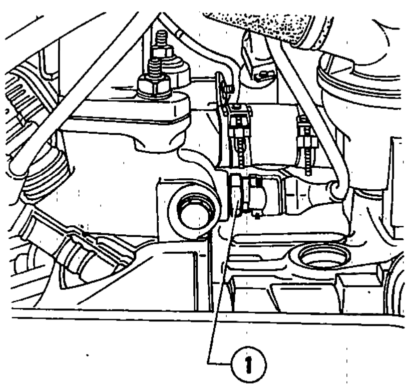


1 Air flow sensor

COOLANT TEMPERATURE SENSOR

When starting the engine from cold, during the warming up of the engine, the engine requires a considerably enriched mixture. This enrichement must be reduced as the temperature of the engine increases and eliminated when the engine reaches normal running temperature.

These variations in temperature are transmitted to electronic CU by the coolant temperature sensor and the CU then control the quantity of fuel injected.



1 Engine coolant temperature sensor

SWITCH ON BODY OF ACCELERATOR THROTTLE

The switch on the throttle body is firmly fixed to the spindle of the accelerator throttle valve. The switch contains a full load contact. In this way a signal is sent to the electronic CU when the engine is running under conditions of full load and the CU is able to alter the air-petrol ratio according to the requirements of these engine conditions.

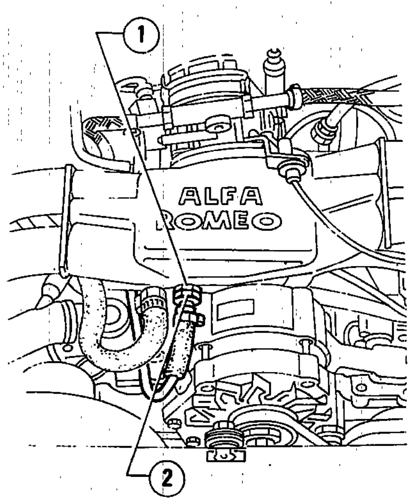
When the aceelerator is released the fuel supply is cut off by means of the minimum throttle opening switch.

When the accelerator throttle valve closes and the engine r.p.m. is higher than 1600 r.p.m., the fuel'supply is cut off until the engine r.p.m. cornes down to 1100 rpm approx., where the fuel supply is restored. The main purpose of fuel tut-off when the accelerator is released is to reduce both fuel consumption and the emission of unburnt hydrocarbons which usually form during this phase.

IDLE ADJUSTMENT BY-PASS

A tube connecting the corrugated air intake sleeve with the supply manifold acts as a by-pass to the accelerator throttle; the 'amount of air that can pass through, this tube can be varied by means of an adjusting screw. By acting on this adjusting screw the idle r.p.m. of the engine can be altered without affecting the exhaust CC%.

In fact, the variation in the amount of air taken in by the engine whsn this screw is adjusted is measured by the air flow sensor which in turn provides for the proportional correction of the quantity of fuel that is injecfed.



1 Lock nut
2 Idle r.p.m. adjusting screw

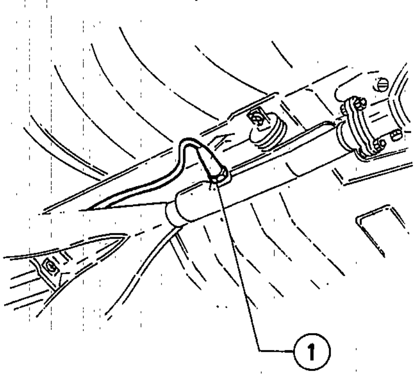
The iollowing components are foreseen only on models with catalytic converter.

FILLER INLET FOR UNLEADED PETROL

The filler inlet of the fuel tank is fitted with a special device which prevents filling with petrols other than those which are unleaded.
Only the delivery nozzles of unleaded petrol pumps are able to pass through the neck of the filler inlet, thus opening the valve and filling the tank.

LAMBDA PROBE

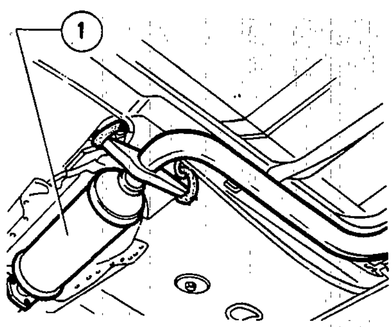
The sensitive element of the lambda probe consists of a ceramic capsule coated with porous platinum on both sides; the external side cornes into contact with the exhaust gases, whilst the internal side cornes into contact with'atmospheric air.
The difference in the oxygen content between the air of the atmosphere and the exhaust gases is transformed into an electrical potential difference across the two sides of the capsule. This electrical signal is 'sent to the electronic CU which carries out those corrections necessar = y for obtaining the stechiometric air-petrol ratio required for the maximum operating efficency of the catalyst, thus keeping harrhful emissions contained in the exhaust gases to a minimum.
The probe is electrically preheated to obtain a faster response time.



1 Lambda Probe

CATALYTIC MUFFLER

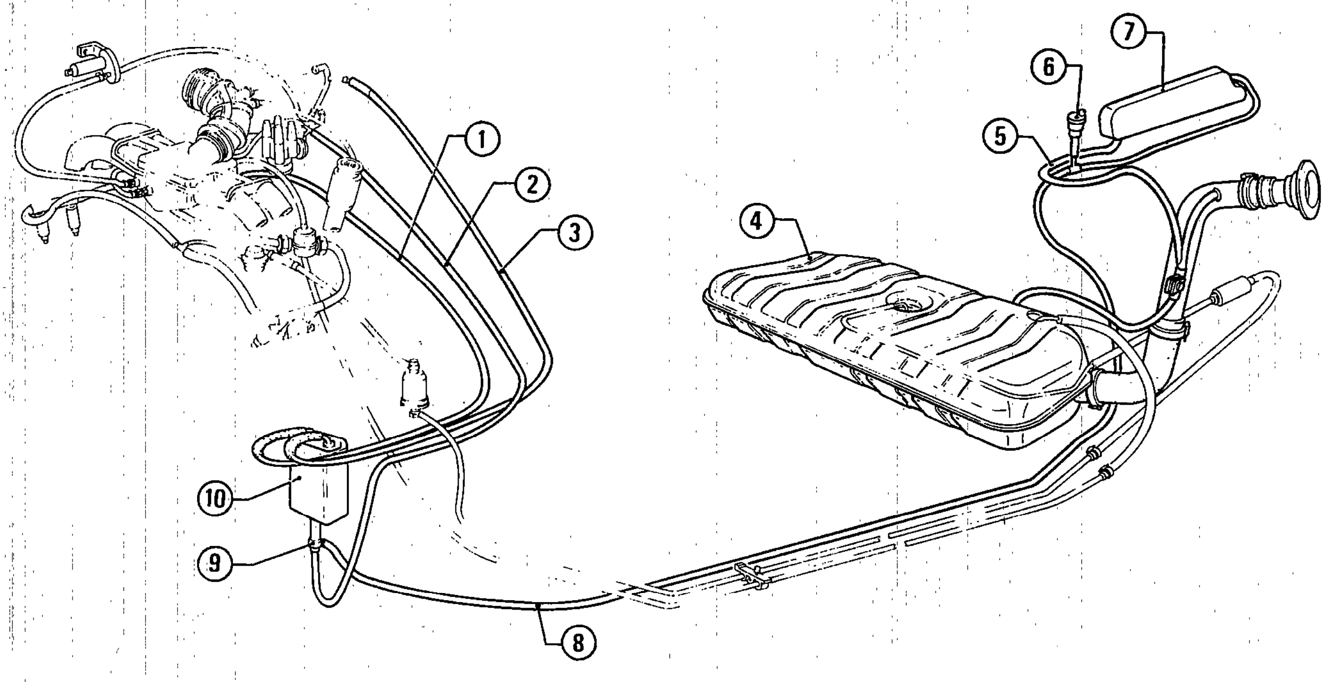
A catalytic converter is mounted in the exhaust system with the purpose of reducing exhaust emissions. The converter consists of an alumina monolith coated with an active material composed of noble metals and housed in a special steel container which is resistant to high temperatures. The system converts the HC and CO emissions contained in the exhaust gases into water and CO, (non-toxic substances).
The catalyst is efficient within a certain temperature range. At low temperatures no catalytic conversion occurs. High temperatures can cause deformation of the metallic container and deterioration of the alumina'and a consequent loss in the efficency of the operation of the catalyst itself. High temperatures can be caused by an excessive quantity of unburnt fuel passing through the alumina, following overloading of the engine or by the engine being badly tuned and out of adjustment.



1 Catalytic muffler

FUEL VAPOUR EMISSION CONTROL SYSTEM

Fuel vapours emanating from the fuel tank ④ are collected, by means of a special tube ⑤ in a liquid vapour separator ⑦ which is arranged in such a way as to permit the return of condensed fuel to the tank.
The tank has a sealed filler cap to prevent fuel vapours from escaping into the atmosphere.
The fuel vapours coming from the separator ⑦ through the upper outlet, are conveyed to a fuel vapour filter ⑩.
The vapour flow is controlled by a valve ⑨ which opens or closes the passage to the fuel filter in relation to the vacuum pressure existing upstream the throttle body. When the vacuum pressure is lower than the specified value (e.g. with the engine switched off or on idle) the dump valve is closed and prevents vapours from flowing to the vapour filter. If this is not the case (engine running under normal conditions) the valve is open and the fuel vapours are able to flow to the filter where they are absorbed by activated carbon.
As a result of the difference in pressure existing inside the vapour filter, the activated carbon is "washed" by a current of air.
The vacuum pressure is taken upstream the throttle. In the "washing" action, the fuel vapours mlxed with atmospheric air are conveyedto the supply manifold where they are added to the air taken in by the engine.
Should the pressure in the fuel vapour separator tend to a drop when the engine is stopped, due to a fall in temperature, a compensation valve ⑥ situated in the fuel vapour recovery tubing ⑧ between the separator ⑦ and the vapour filter ⑩ , lets in atmospheric air thus maintaining the system at atmospheric pressure.
The dump valve ⑨ as an internal spring which is set in such a way as to open the passage should the vapour pressure in the tank be excessive. In this case the fuel vapours can be discharged into the vapour filter ⑩ and held in the activated carbon'of the filter itself.



1 Fuel vapour intake tube
2 Vacuum pressure tube for dump valve control
3 External air delivery tube
4 Fuel tank
5 Fuel vapour breather hose
6 Compensation valve
7 Fuel vapour separator
8 Fuel vapour recovery tube
9 Dump valve
10 Fuel vapour filter

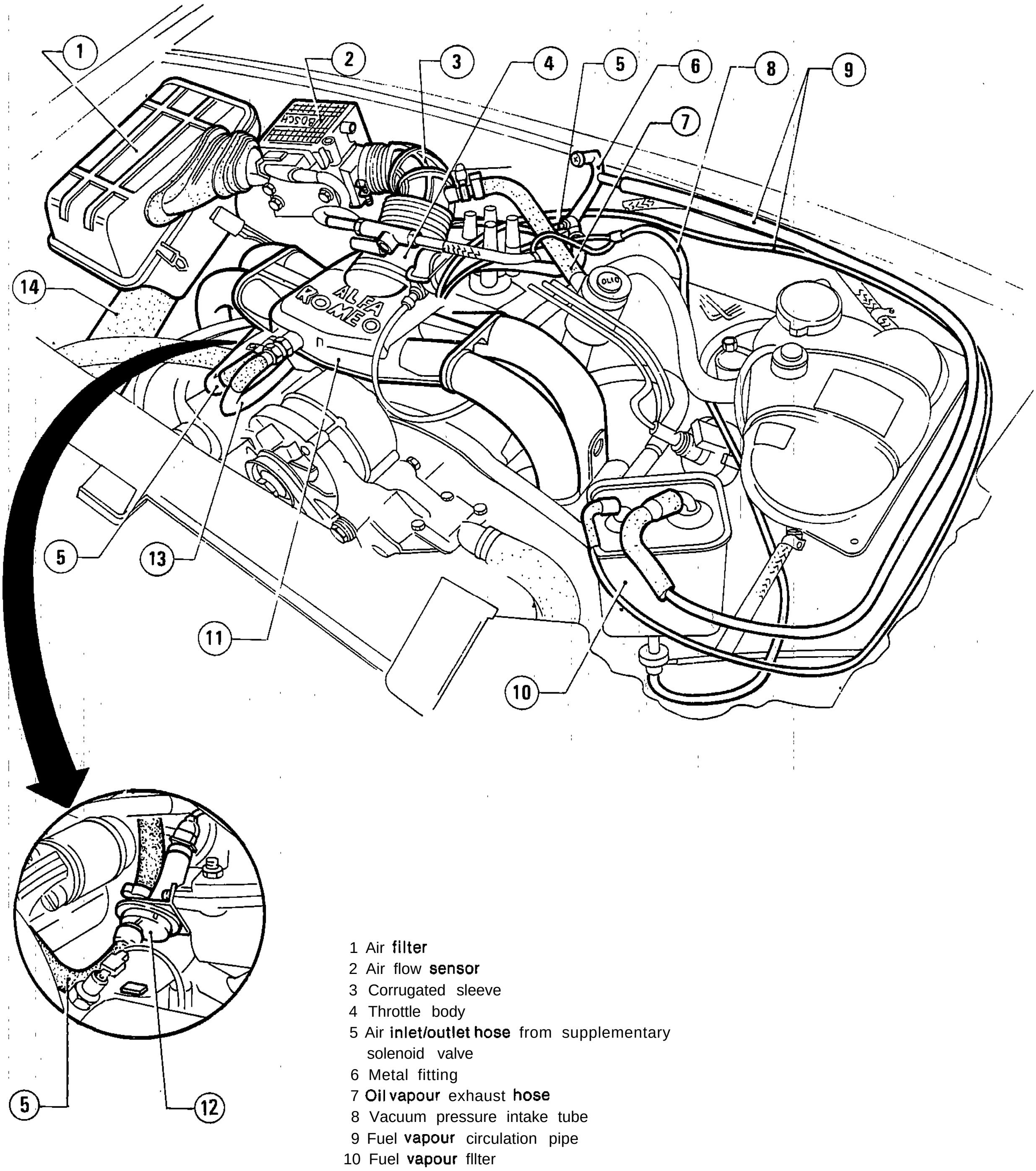
IMPORTANT GENERAL DATA

Never start the engine when the battery cables are not properly connected.
To start the engine, never use a rapid battery charger.
Never disconnect battery from vehicle electronic system when the engine is started.
In no case use a rapid battery charger.

- **When painting in furnace at temperature over 80 °C, remove the electronic control unit.**
- **Make sure that screened wire connections are properly connected.**
- **Never connect or disconnect electronic CU conductor plug when ignition is switched on.**
- **Never connect to ground high or low voltage cables, for testing.**
- **Should any accessories be mounted on vehicle, it is always advisable to disconnect electronic CU and to check the functioning accessories with the CU disconnected. It is very strongly advised never to connect any leads (other than those of the CU itself) to the wiring of the CU.**

AIR SUPPLY CIRCUIT

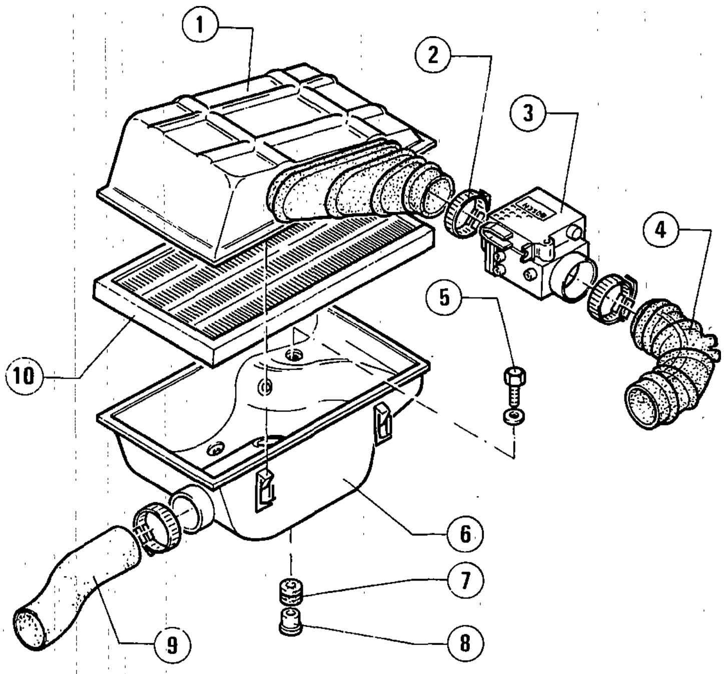
For electronic injection 1.7 engine only



1 Air filter
2 Air flow sensor
3 Corrugated sleeve
4 Throttle body
5 Air inlet/outlet hose from supplementary solenoid valve
6 Metal fitting
7 Oil vapour exhaust hose
8 Vacuum pressure intake tube
9 Fuel vapour circulation pipe
10 Fuel vapour fllter
11 Air manifold
12 Extra air solenoid valve
13 By-pass tube to set idle rpm
14 Air intake sleeve

(*) only for vehicles with catalytic converter

AIR FILTER



1 Air filter cover
2 Clamp
3 CU flow meter
4 Corrugated sleeve
5 Adjustment screw to fix air filter container to body
6 Air filter container
7 Spring element
6 Spacer
9 Air intake sleeve
10 Filtering element

REMOVAL

Disassemble air cleaner body as follows (see figure):

1. Unfast the clamp ② and disconnect air cleaner cover sleeve from air flow sensor ③.
2. Unfasten the four spring clips securing cover ① and remove it; remove the filtering element ⑩.
3. Unscrew three screws ⑤ securing cartridge ⑥ to body; remove filter container ⑥ with spring element ⑦ and spabers ⑧ disconnecting sieeve ⑨ from air intake.
4. In necessary, loosen clamp and disconnect sleeve ⑨ from container ⑥.

CHECK AND INSPECTIONS

Thoroughly clean filtering element by blowing low pressure compressed air through the filter in the opposite direction to that of the normal air flow. If necessary, replace filtering element.

ASSEMBLY

Assemble air flow sensor/CU following disassembly procedure in reverse sequence.

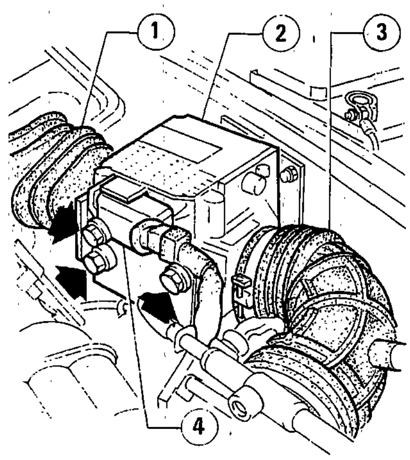
- Position the filtering element in the container so that the folded protrudding part is facing downwards.

AIR FLOW SENSOR

The body of fhe air flow sensor incorporates the electronic control unit for the piloting of the fuel injection system.

REMOVAL

1. Disconnect the multipolar connector ④ from the body of the sensor ②.
2. Loosen the clips securing the ducts ① and ② and detach them from the air flow sensor.
3. Unscrew the three screws shown in the fi ure and remove the air flow sens o8 r 2 .
4. Only if necessary, unscrew the four screws (one 'of which lies beneath a sealed plug) and remove the cover of the air flow sensor. The electronic control unit is contained in the cover.



1 Air inlet duct
2 Air flow sensor
3 Corrugated air intake duct
4 Multipolar connector

CHECKS AND ADJUSTMENTS

Press gently on the floating throttle of the air flow sensor and check that it rotates freely and smoothly as far as the travel stop. If necessary, clean the internal surfaces of the air flow sensor with a cloth.

REFITTING

Refit the air flow sensor/electronic control unit by reversing the order of its removal.
If it is being replaced, proceed to the checking and adjustment (if necessary) of the exhaust CO% (see Setting and Adjustments).

SUPPLEMENTARY AIR SOLENOID VALVE

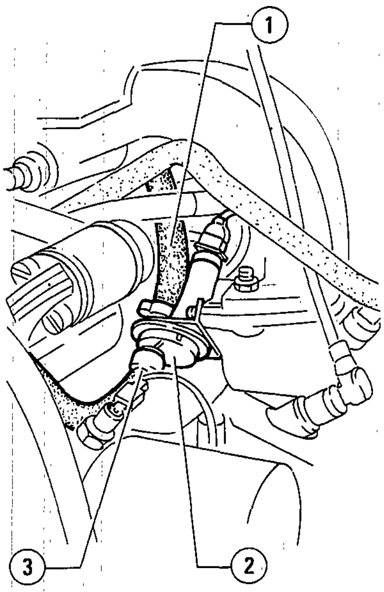
CHECK AND ISPECTIONS

1. Check solenoid valve opening

a. Make sure that the engine is cold, then start and throttle several times outlet tube ① of solenoid valve ②
b. Check that engine rpm falls and continues to fall with the passage of time (at room temperature of 20°C no fall in r.p.m. will be noticed after 3 **minutes).**

2. Check solenoid valve closing

With the engine at normal running temperature, throttle outlet tube ① of solenoid valve and make sure that engine rpm does not decrease.

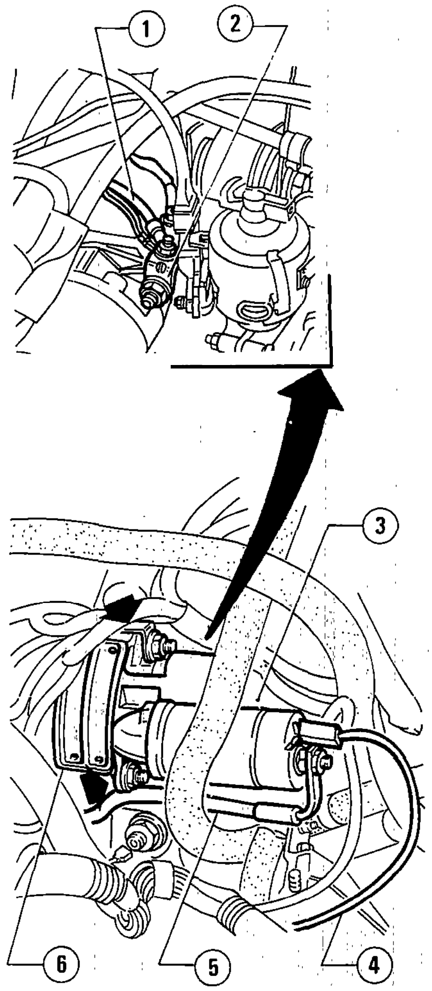


1 Air outlet tube
2 Supplementary air solenoid valve
3 Air inlet tube

REPLACEMENT

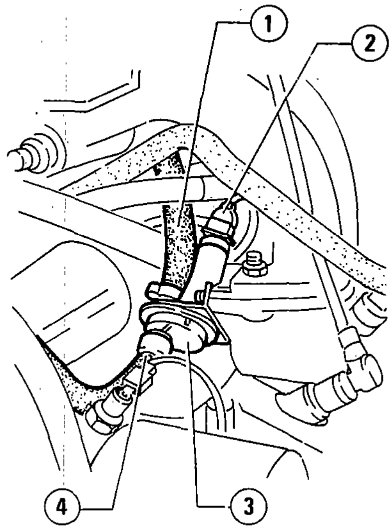
1. Disconnect battery negative terminal.
2. Remove air filter cover, air flow sensor, and corrugated sleeve.
3. Disconnect cables ④ and ⑤ from starter ③.
4. Remove plastic cover ⑥.
5. Unscrew the two figure-shown bolts fixing starter ③ and remove it.

One of the bolts fixes ground supports and battery negative terminal 8[1] .



1 Battery negative cable
2 Ground support
3 Starter
4 Starter energization cable
5 Starter supply cable
6 Cover

6. Disconnect connector ②.
7. Loosen clamps and disconnect tubes ① and ④ from solenoid valve.
6. Unscrew fixing screws and remove solenoid valve ③.
9. Proceed to assembly operating in reverse order in respect to removal.

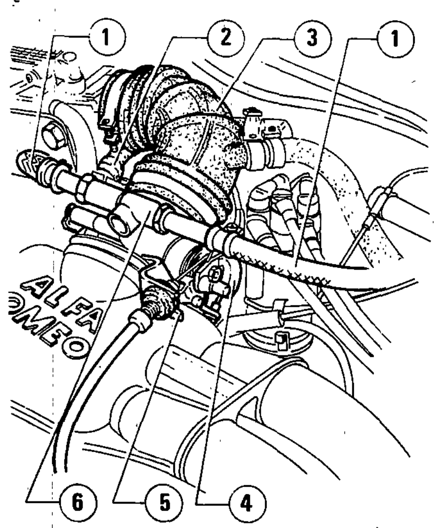


1 Air outlet tube
2 Solenoid valve control cable
3 Supplementary air solenoid valve
4 Air inlet tube

THROTTLE BODY

REMOVAL

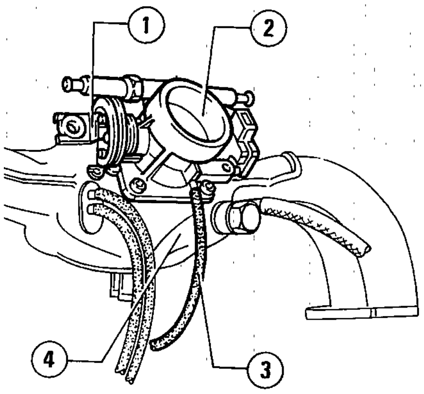
1. Rotate accelerator control lever ④ and withdraw pawl on end of accelerator cable.
2. Remove lock ring and withdraw sheath end from bracket ⑤
3. Loosen clamp and disconnect tubes ① from throttle body ⑥.
4. Disconnect connectar ② from switch.
5. Loosen fixing clamp and disconnect sleeve ③ from throttle body.



1 Sreather tubes of engine cooling system
2 Acceterator throttle switch connector
3 Corrugated sleeve
4 Accelerator control lever
5 Bracket
6 Throttle body

6. Disconnect depression tube ③ .
7. Unscrew four fixing screws and remove throttle body ② and gasket from supply manifold ④ .

The two upper screws fix braket ① as well .



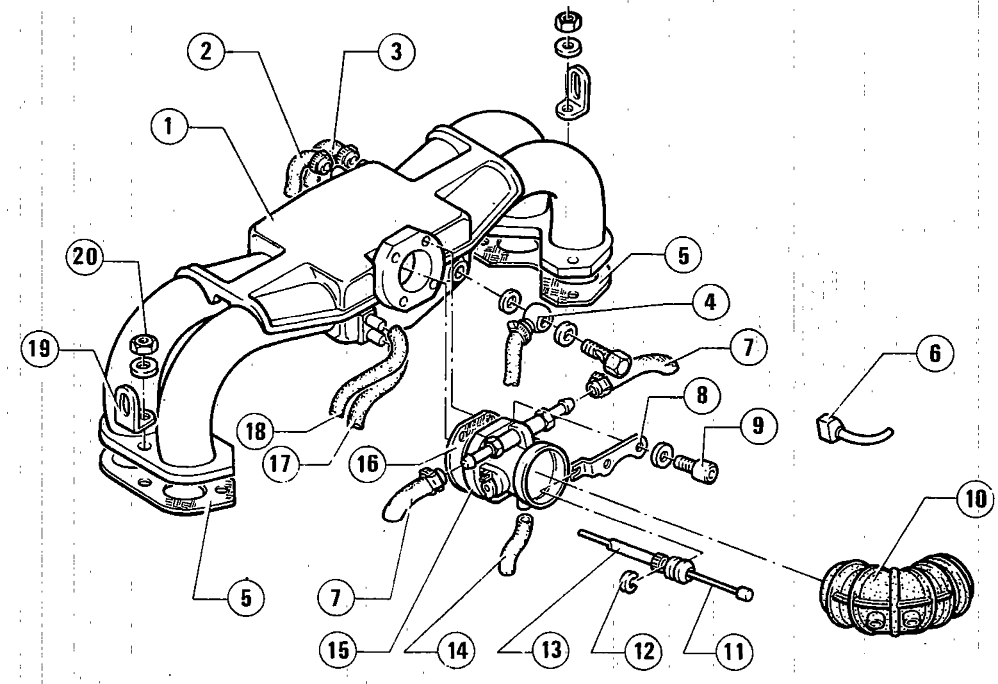
1 Cracket fixing accelerator cable sheath
2 Throttle body
3 Depression tube
4 Supply manifold

REMOVAL

Proceed to assembly operating in reverse order in respect to removal, following these instructions:

- Fit a new gasket between throttle body and intake manifold.
- Effect 'calibration and setting (see: Calibrations and Settings).

INTAKE MANIFOLD (AIR INTAKE BOX).



1 Intake manifold
2 By-pass tube to set idle rpm
3 Supplementary air feed tube
4 Servobrake depression tube fitting
5 Gaskets
6 Throttle body switch wiring
7 Cooling system breather pipes
6 Sheath fixjng bracket of acceleratorcable
9 Throttle body fixing screw to manifold
10 Corrugated sleeve
11 Accelerator control cable
12 Lock ring
13 Accelerator cable sheath
14 Depression tube for ignition advance pneumatic regulator
15 Throttle body
16 Gasket
17 Depression tube for fuel vapour cleaner (for models with catalytic converter only)
18 Depression tube for fuel pressure
19 Engine lifting bracket
20 Nut fixing supply manifold

REMOVAL

With reference to figure, operate as follows:

1. Remove air filter cover and air flow sensor.

2. Rotate accelerator control lever and unhook pawl at accelerator cable end ⑪ .

3. Remove lock ring ⑫ and disconnect sheath ⑬ from bracket ⑧.
4. Disconnect wiring ⑥.
5. Disconnect tube ⑦ from throttle body.
6. Ldosen clam s and disconnect tubes ② and ⑬ from manifold ①.
7. Disconnect tubes ⑰ and ⑱ from manifold and tube ⑭ from throttle body; (only for models with catalytic converter).
6. Unscrew fixing ④ and separate servobracket depression tube from manifold.
9. Loosen clamp and disconnect sleeve ⑩ from throttle body ⑮.

10. Unscrew three nuts ⑳ on each manifold end and remove manifold with gasket ⑤.

Central nuts also secure the engine lifting brackets ⑲.

11. If necessary, remove four screws ⑨ and separate throttle body ⑮ with gasket ⑯ from manifold.'

Two u per screws also secure brackets 6⁸.

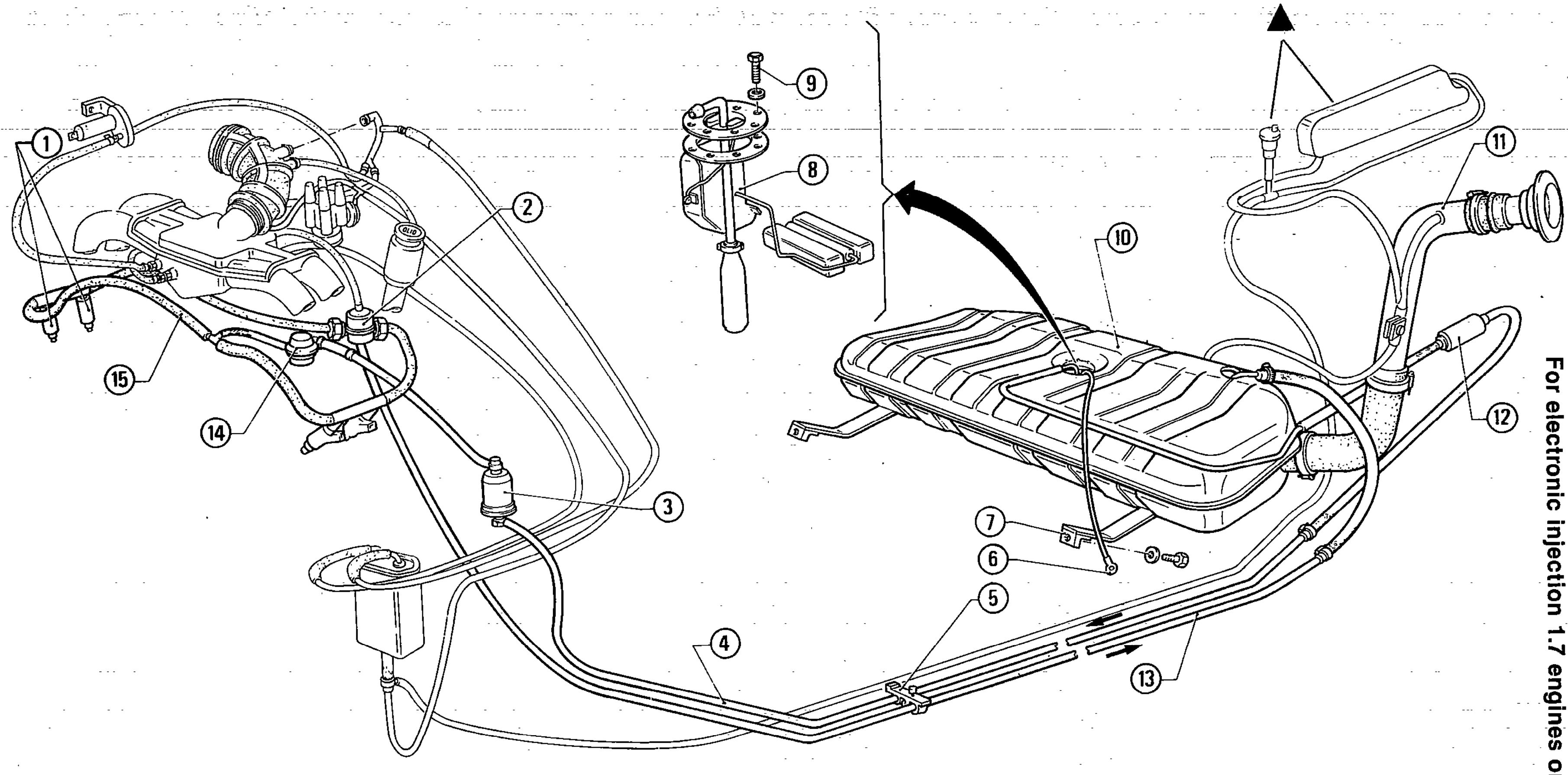
ASSEMBLY

Proceed to assembly operating in reverse order in respect to removal, following these instructions:

- Fit new gasket between:
  - Throttle body and manifold
  - Manifold and ducts on heads.
- Effect check and, if necessary, adjust accelerator control cable (see: Group 00)
- Effect check and, if necessary, adjust idle rpm (see: Group 00).

FUEL SUPPLY SYSTEM

For electronic injection 1.7 engines only



▲ (*) only for models with catalytic converter

1 Electronic injectors
2 Pressure gauge
3 Fuel filter
4 Fuel supply tube
5 Tube support spring
6 Ground cable
7 Fuel tank fixing strap
8 Fuel level gauge assy
9 Level gauge fixing screw
10 Tank
11 Filler pipe
12 Fuel pump
13 Excess fuel recovery pipe
14 Pulsation damper
15 Fuel supply hose

FUEL PUMP

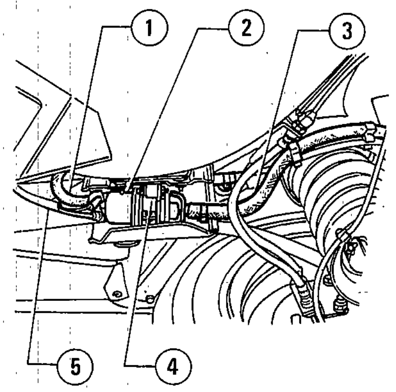
REPLACEMENT

1. put the vehicle on auto lift and disconnect battery negative terminai.

2. Operating from below the vehicle, left rear side, disconnect cables ⑤ supplying the pump ②.

3. Pinch tubes ① and ③, then loosen clamps and disconnect tubes from the pump.

4. Loosen clapm ④ and extract the pump ②.



1 Fuel outlet tube from pump
2 Fuel pump
3 Fuel inlet tube into pump
4 Pump supporting clamp
5 Pump supply cable

5. Mount new fuel pump fixing it with relevant clamp, then reconnect tubes.

6. Reconnect pump supply cables, being careful to connect the correct lead to the correct terminal.

7. On completion of refitting, remove pliers on inlet and outlet tubes and reconnect battery.

DAMPER

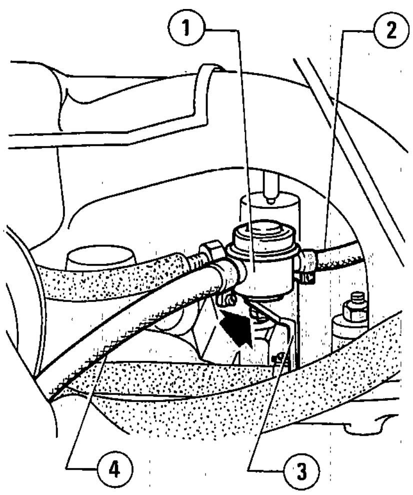
REPLACEMENT

1. Loosen clamps and disconnect fuel inlet and outlet tube ② and ④ from damper.

WARNING:
Be careful: fuel system could be pressurized

---

2. Unscrew figure-shown fixing nut and remove damper ① from bracket ③.



1 Damper
2 Fuel inlet tube into damper
3 Support bracket
4 Fuel outlettube from damper

3. Refit a new damper working in reverse order respect to removal.

ELECTROINJECTORS

CHECKS AND INSPECTIONS

Check on correct electroinjectors opening

1. Detect CO percentage at exhaust (see: Group 00 - Engine Maintenance).

2. Disconnect electroinjectors connectors one by one; each time detect CO percentage at exhaust and check that value remains constant at all checks.

3. If this is not the case, locate the faulty electroinjectr and replace it. (seei Replacement).

4. In all cases, a visual index of electroinjectors functionality is provided by comparing spark plug electrodes.

— A too-rich mixture shows black colour.
— A too-poor mixture shows light colour.

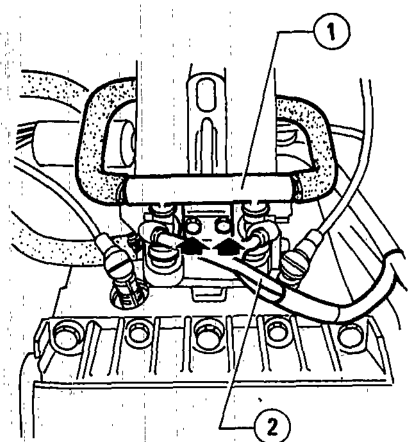
REPLACEMENT

1. Disconnect battery negative terminal.

2. Disconnect supply wiring connectors ② from electroinjectors.

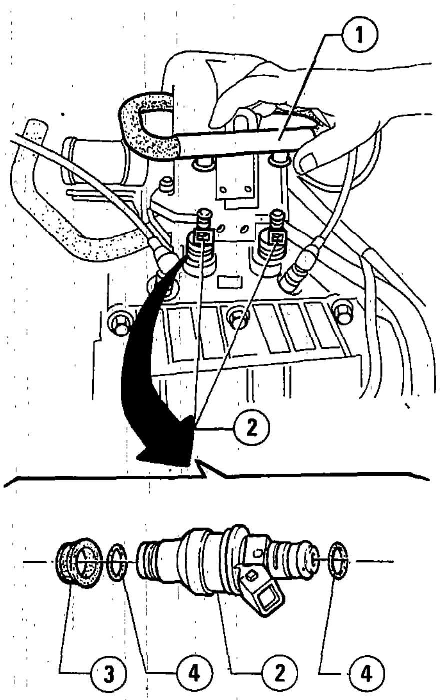
3. Unscrew figure-shown fixing screw and lift the fuel supply hose ① freeing it from electroinjectors.

WARNING:
Pay attention so that residual pressure in the tubing does not cause sprays of fuel.



1 Fuel supply hose
2 Electroinjectors supply wiring

4. Remove electroinjectors ② complete with b-ring ④ and gasket ③



1 Fuel supply, hose
2 Electroinjectors
3 Gasket
4 O-rings

5. Proceed to assembly operating in reverse order in respect to removal, following these instructions:

- Replace all O-rings and gaskets.
- Position electroinjector and relevant connector outward.
- Reconnect all components removed at removal time.

FUEL PRESSURE GAUGE

REPLACEMENT

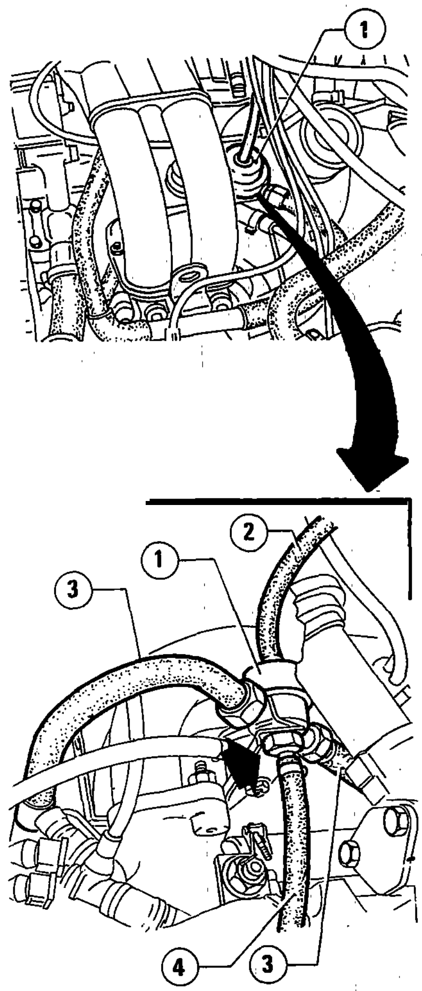
WARNING:
Operate carefully: fuel system coud be pressurized.

---

1. Unscrew the two connecting fittings of fuel supply hose ③ to regulator ① .

2. Disconnect tube ② from regulator.

3. Connect tube ④ , unscrew figure-shown nut, and remove regulator ① .

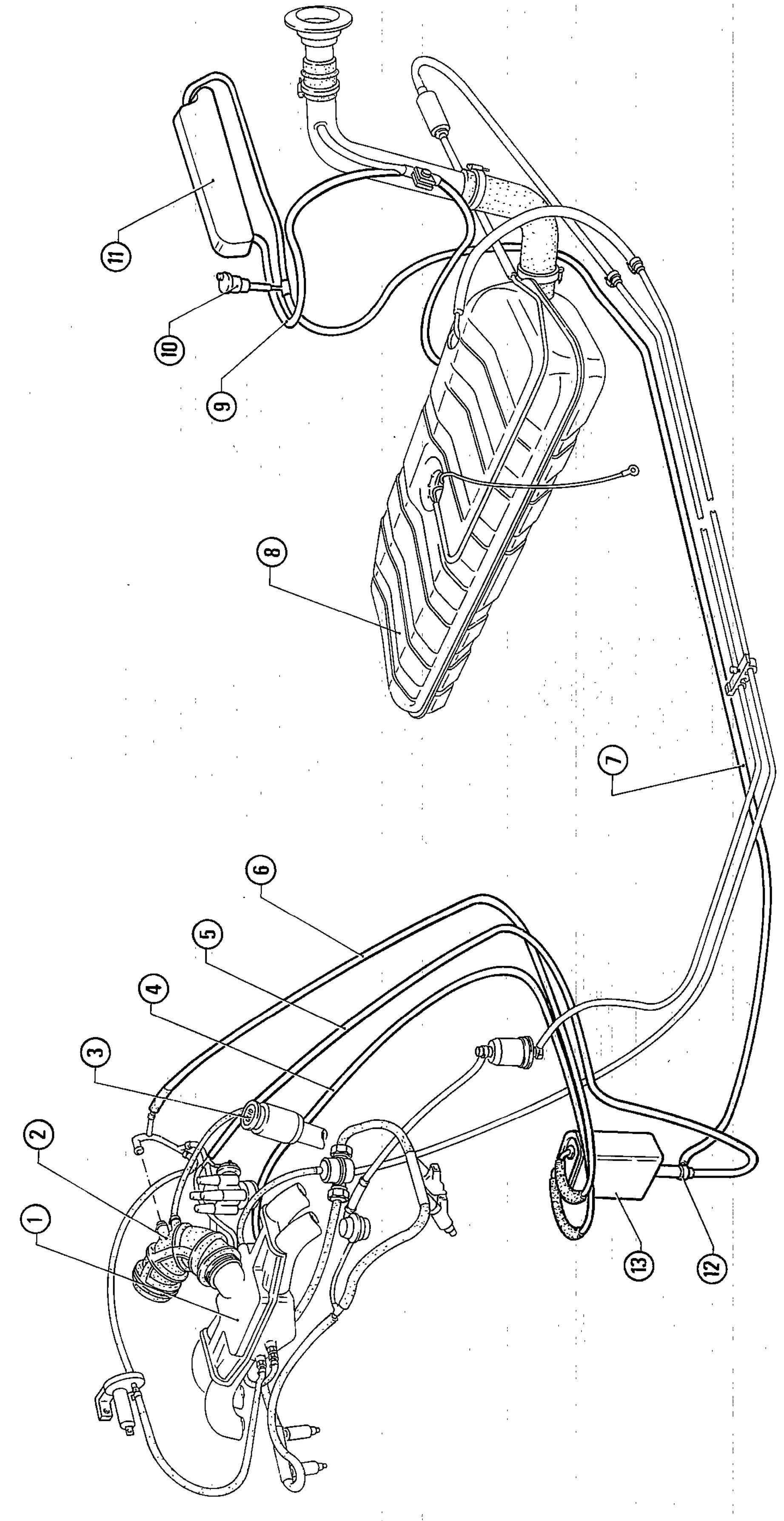


1 Pressure regulator
2 Depression tube for pressure regulator
3 Fuel supply hose
4 Excess fuel recovery tube

4. Effect assembly operating in reverse order in respect to removal.

FUEL VAPOUR EMISSION CHECK SYSTEM

For electronic injection 1.7 engines with catalytic convertor



1 Fuel manifold
2 Corrugated sleeve
3 Oil vapour separator
4 Fuel vapour intake tube
5 Depression tube for dump valve control
6 External air tube
7 Fuel vapour recovery tube
8 Fuel tank
9 Fuel vapour breather tube
10 Compensation valve
11 Fuel vapour separator
12 Air valve (check on fuel vapour flow)
13 Fuel vapour filter

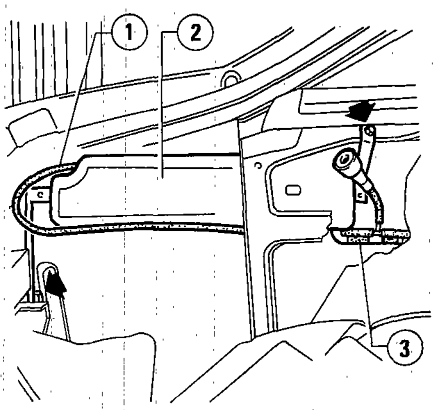
FUEL VAPOUR SEPARATOR

REMOVAL AND ASSEMBLY

1. Move away left side covering of trunk.

2. Loosén clamps and disconnect tubes (1) and (3) from separator.

3. Unscrew the two securing nuts indicated in the figure and remove the separator (2)



1 Fuel vapour recoverv tube
2 Fuel vapour separator
3 Fuel vapour exhaust pipe

4. If necessary, blow compressed air inside the separator to clean it.

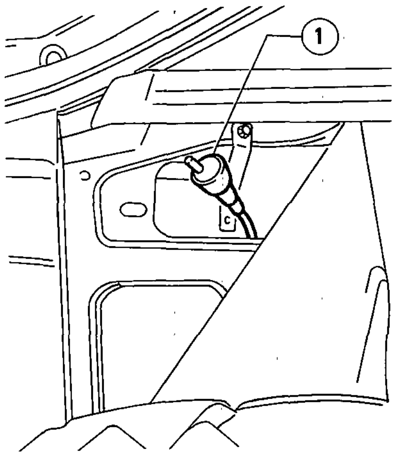
5. For essembly, operate in reverse order in respect to removal.

COMPENSATION VALVE

REMOVAL, CHECK AND INSPECTIONS, ASSEMBLY

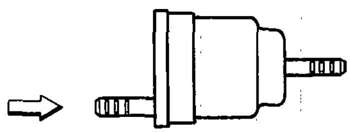
1. Partially remove the trunk left side covering.

2. Disconnect' valve (1) from fuel recovery tube circuit.



1 Retainer valve

3. Ceck that valve works properly that is, that otherwise, replace valve it allows the passage of air only in the direction shown by the arrow.

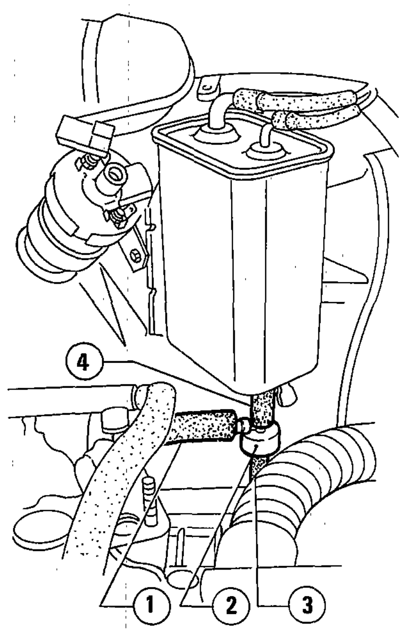


4. Proceed to assembly in reverse order in respect to removal, properly repositioning the valve as stated in the figure in step (2)

DUMP VALVE

REMOVAL AND ASSEMBLY

1. Operating in the engine compartment, front left area below fuel vapour filter, remove valve (2) from tubes (1), (3) ,and (4).



1 Fuel vapour recovery tube
2 Dump valve
3 Depression tube
4 Supply tube to fuel vapour filter

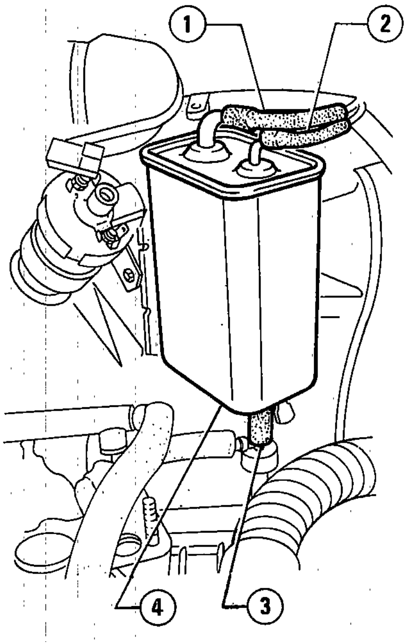
2 Proceed to assembly operating in reverse order in respect to removal, properly repositioning the valve as shown in previous figure.

FUEL VAPOUR FILTER

REMOVAL AND ASSEMBLY

1. Disconnect tubes (1), (2), and (3) from filter.

2. Unscrew fixing screw positioned under filter (4), lift it and remove it.



1 External air tube
2 Fuel vapour intake tube
3 Fuel vapour inlet tube
4 Fuel vapour filter

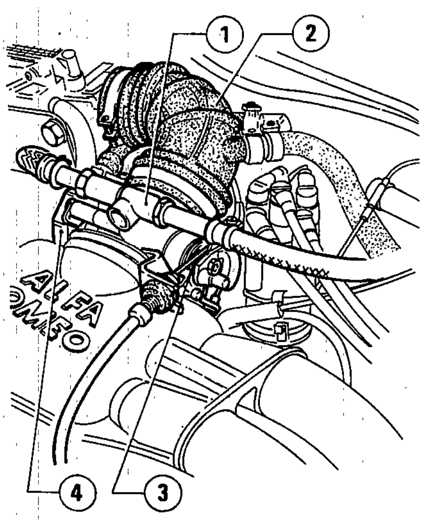
3. For assembly, operate in reverse order in respect to removal.

CALIBRATIONS AND ADJUSTMENTS

For electronic injection' 1.7 engines only

CALIBRATION THROTTLE BODY (Flow)

1. Loosem clamp and disconnect sleeve ② from throttle body ①.
2. Disconnect depression tube under throttle body ① and suitably plug the relevant fitting.
3. Loosen switch ④ fixing screws on throttle body.
4. Disconnect accelerator control cable.



1 Throttle body
2 Corrugated sleeve
3 Accelerator control cable
4 Accelerator throttle switch

5. Verify throttle body calibration with a flowmeter, working as follows:

a. Dismantle C.2.0056 buffer, separating it from the relevant threaded stem.

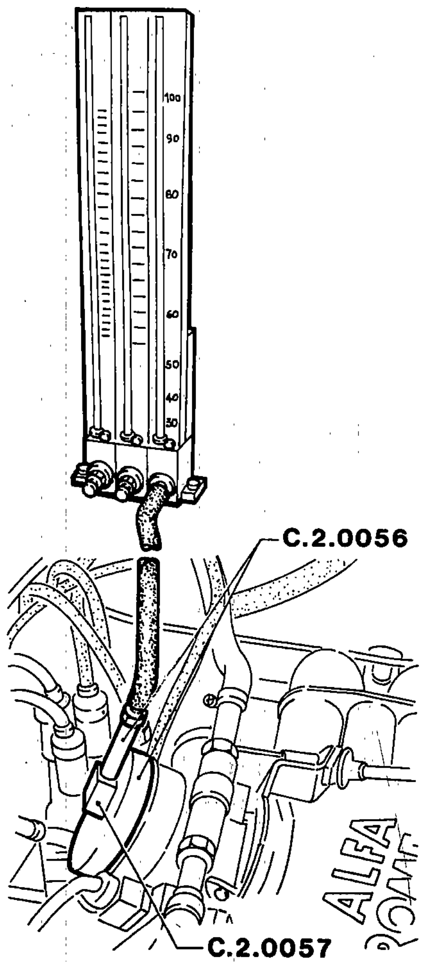
b. Screw C.2.0057 fitting on buffer, and screw the threaded stem on fitting (as per figure).

c. Connect flowmeter to C.2.0056 buffer and rest buffer on throttle bpdy.

cl. Measure air flow through the throttle and check that this is within the specified values (plug the air intake fitting on the throttle body).

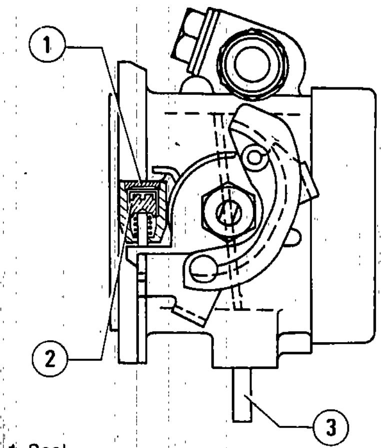
Blowby of air: accelerator throttle in the closed position (Solex flowmeter):

400 ±10 on N **scale**



6. If you don't detect specified values, proceed to setting.

a. Break seal (1) and act on adjusting screw (2) until speciofied flow value is obtained.



1 Seal
2 Adjusting screw
3 Air intake fitting

b. On completion of the setting reseal the seating of the adjusting screw with the relative cap.

7. Remount disconnected components operating in reverse order, then effect further setting.

ACCELERATOR THROTTLE SWITCH CALIBRATION

1. Disconnect female connector from "throttle switch. Check on male connector the following resistances with a tester.

a. With throttle entirely closed between terminals 2 and 18 one must detect a resistance of ablout 0 .

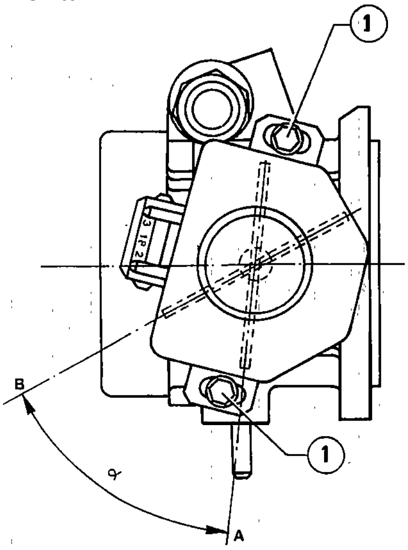
b. Slowly rotate throttle: with tester between terminals 2 and 18 one must detect an' infinite resistance before throttle has rotated by 1° with respect to fully closed position.

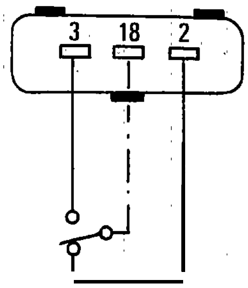
2. If this Con~dition doesn't take place, loosen screw (1) and rotate switch until the contact is obtained (resistance = 0) between terminals 2 and 18 with completely closed throttle; then tighten screws again.

3. Rotate throttle 60° ± 4° and check full load contact closed, detecting following resistances on male connectors, with tester.

— With accelerator throttle open by an angle of α_3 60° ± 4° between terminals 3 and 13 one must detect a resistance of 0 approximately.

4. If these value are not detected, check accelerator control of replace switch.





1 Screw fixing switch to throttle body
2 Idle rpm terminal (it corresponds to position A: closed throttle)
3 Max. rpm (it corresponds to position B: open throttle)

CO PERCENTAGE TIMING AT EXHAUST

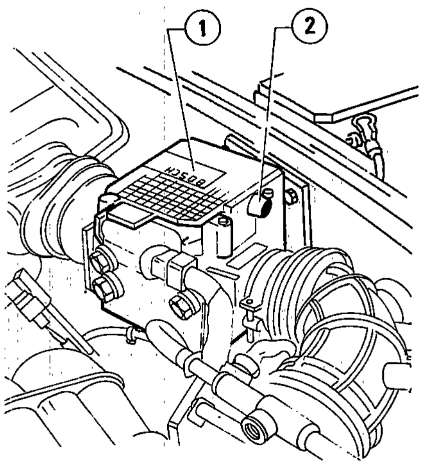
Detect CO percentage on exhaust gas following the procedure stated in Group 00 - Engine Maintenance - Exhaust Emission Control.

Whenever detected values are higher than maximum specified values, check power supply components and if they are faulty, replace them.

WARNING:
CO percentage setting and exhaust shoul be carried out, if necessary, only if 'an air flow sensor and electronic CU have been replaced.

Operate as stated below::

1. Remove seal cap (2).



1 Air flow sensor/electronic C U
2 CO Setting screw seat sealing cap

2. Start engi'ne and run it to normal running temperature.

3. Connect a suitable exhaust gas analyzer on exhaust pipe outlet.

4. Cautiously act on CO percentage adjustment screw until specified value is obtained.

5. When this operation is complete, put a new seal cap on CO adjustment screw seat.

ELECTRICAL/ELECTRONIC/ COMPONENTS

For electronic injection 1.7 engines only

ELECTRONIC CONTROL UNIT

CHECK OF FUNCTIONING

1. Make sure that lambda probe is efficient (see: Group 00 - Electrical Troubleshooting Procedure - Test No. 8).

2. Start the engine, run it to normal running temperature and keep it at idle r.p.m.

3. Connect a suitable exhaust gas analyzer at exhaust pipe outlet and detect CO percentage of gas (with lambda probe connected).

4. Disconnect depression pipe from pressure regulator and meanwhile look at exhaust gas analyzer gauge.

— If CO percentage rises momentarily and then goes down to normal values, this means that CU works properly (When it is informed that mixture is too rich it will reduce injection time).

— If CO percentage rises and stabilises at high values, this means that CU is not able to correct CO percentage. One can deduct that CU is faulty (since lambda probe is to be considered as efficient following check effected and Step 1).

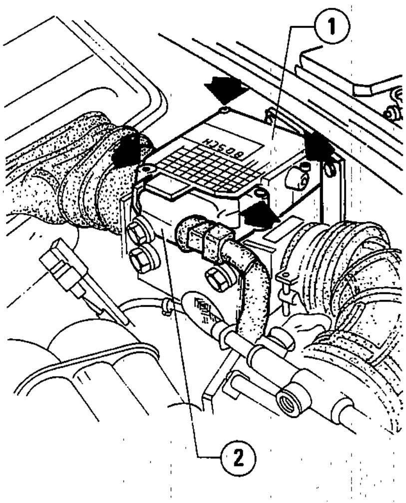
REMOVAL AND ASSEMBLY

The electronic CU is built into the air flow sensor cover.

If necessary, remove CU from air flow sensor and operate as follow.

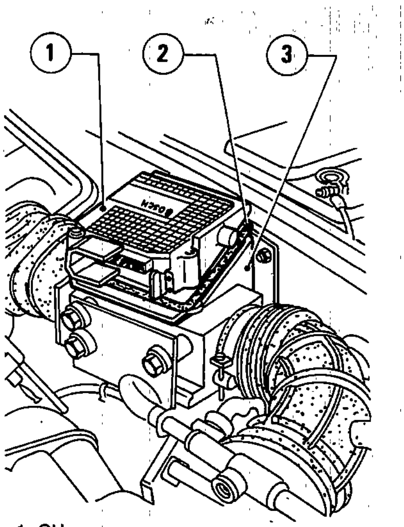
1. Disconnect multipolar connector ②.

2. Unscrew four fixing screws shown in figure (one of which is under seal cap).



1 Electronic control unit
2 Multipolar connector

3. Remove CU ① with seal gasket ②.



1 CU
2 Gasket
3 Air flow sensor

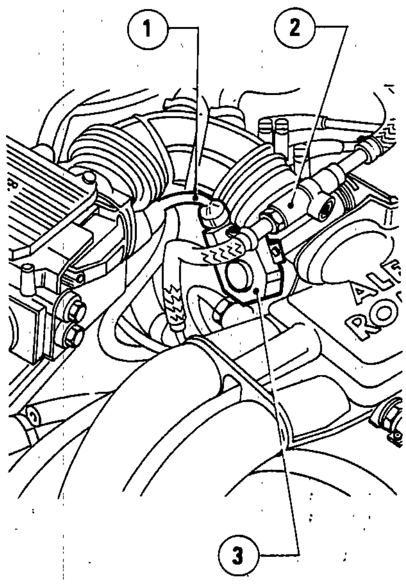
4. Remount CU operating in reverse order in respect to removal, then apply a new seal cap (in screw seat). If CU has been replaced, proceed to check and if necessary, to effect setting of CU percen'tage at exhaust (see: Calibration and Setting).

ACCELERATOR THROTTLE SWITCH

REMOVAL AND ASSEMBLY

1. Disconnect connector ①.

2. Unscrew two fixing screws and remove switch ③ from throttle body ②.

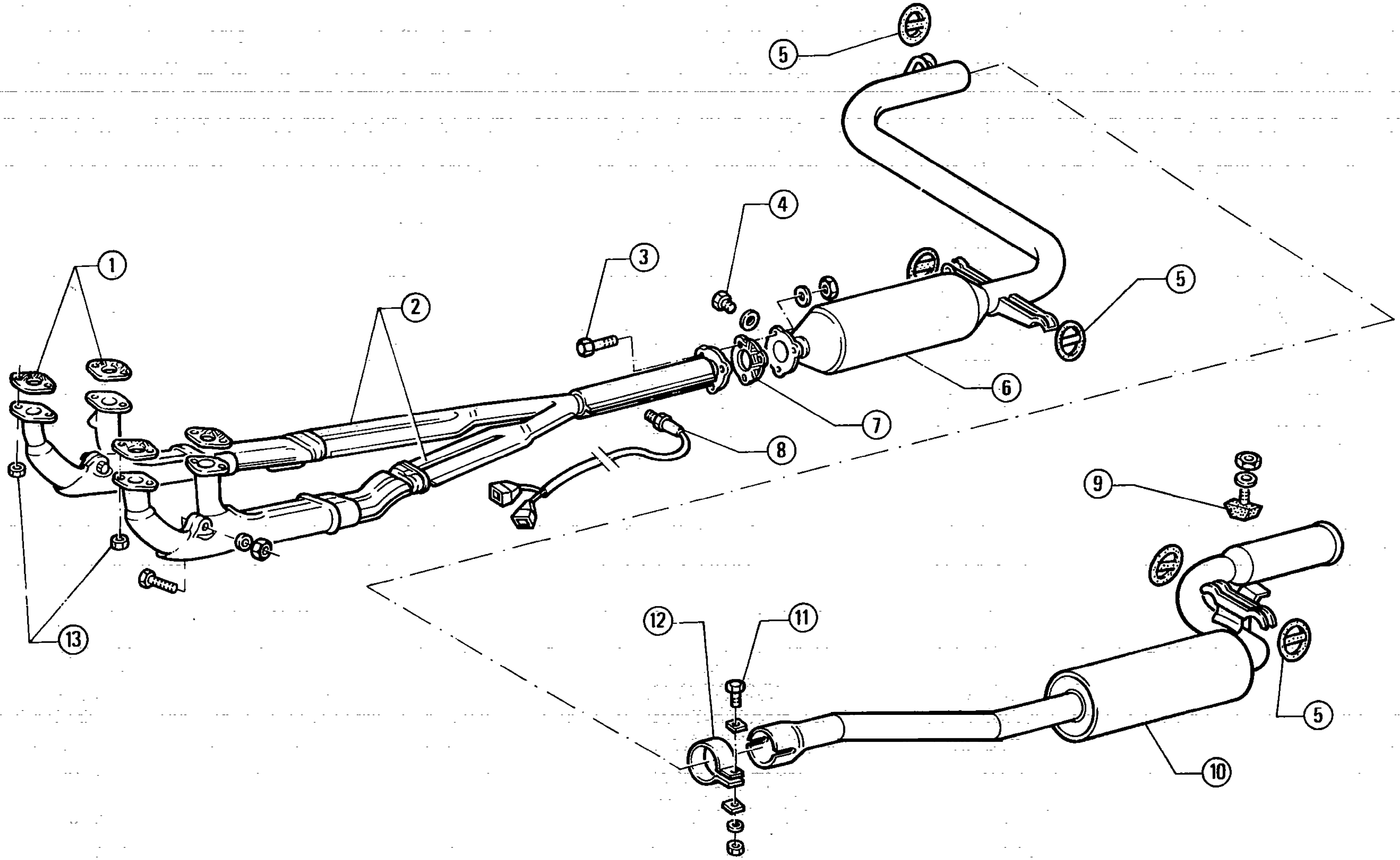


1 Connector
2 Throttle body
3 Accelerator Throttle switch

3. Redmount switch operating in reverse order in respect to removal; then effect switch setting (see: Calibration and Setting).

EXHAUST SYSTEM

For electronic injection 1.7 engines with catalytic converter Alfa 33



1 Gaskets
2 Front manifolds
3 Nut
4 Plug for CO% sampling upstream catalytic muffler
5 Support ring
6 Catalytic muffler
7 Gasket
8 Lambda probe
9 Buffer
10 Rear muffler
11 Clamp fixing bolt
12 Clamp
13 Nuts fixing manifold to heads

PRECAUTIONS TO ADOPT FOR CATALYTIC MUFFLER EQUIPPED VEHICLES

- Use only lead free petrol.
- Avoid petrol level in tank from becoming very low.
- Don't start engine with a disconnected spark plug.
- Don't overload excessively the engine for long periods of time. Be careful when towing uphill for long periods.
- Do not switch ignition off while vehicle is moving. Ignition is to be switched off with vehicle stopped.
- Do not stop or park car on or near inflammable materials (dry grass, fuel residuals, dry leaves, wastes, etc.).

CHECKS AND INSPECTIONS

1. Check mufflers and exhaust pipes making sure they are not in any way damaged or cracked and show no evidence of corrosion; contrarywise, replace them.

Catalytic muffler must be always replaced at Km interval stated in "Group 00 - Vehicle Maintenance Chat?'.

2. Thoroughly check support ring and do not hesitate to replace them if they are cracked, porous or worn.

3. Check buffer on exhaust pipe end.

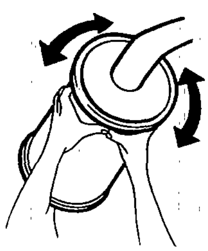
REMOVAL

WARNINGS:
- **Instructions hereafter described have been drawn up so as to allow separate removal of the exhaust system's single components.**
- **Consequently, removal procedure may be changed depending on the operation's purpose.**
- **When rem^ .ng the entire exhaust system, it is advisable to get someone to help you with it.**

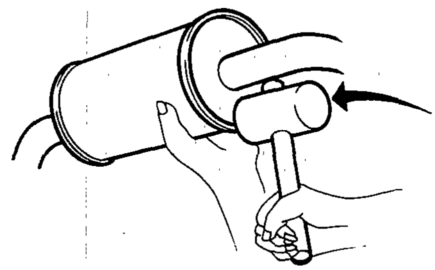
MANIFOLDS AND MUFFLERS

Referring to the figure proceed, with removal as follows:

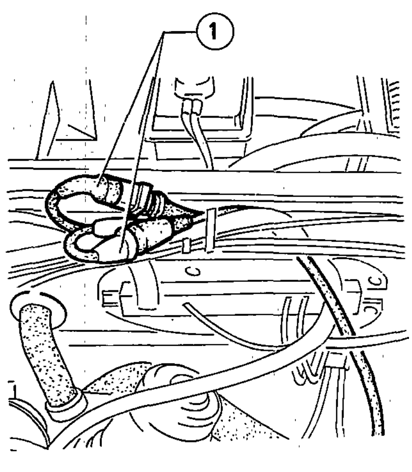
1. Raise car on lift.
2. Remove rear muffler as follows:
(1) Loosen clamp ⑫ connecting central element with rear one and release this one from support retaining rings@.
(2) With a suitable hammer, lightly and repeatedly strike all around the muffler pipes connection area and then alternately turn muffler ⑩ clockwise and counterclockwise so as to make separation easier.



(3) If necessary, use a plastic hammer and lightly strike the muffler in the direction of removal till rear muffler comes off the central muffler.



3. Fiemove central muffler ⑥ as follows:
(1) Operating from below the engine room. disconnect connectors ① shown on following picture and disengage plastic clamps wirings



1 Lambda probe connector

(2) Remove muffler (refer to item 2. above).

(3) Unscrew nuts ③ securing catalytic muffler ⑥ and exhaust manifold ②.

(4) Free catalytic muffler ⑥ support brackets from lock rings ⑤ and remove it.

4. Remove manifolds ② as follows:

(1) Disconnect manifold ② from catalytic muffler unscrewing nuts ③.

(2) Loosen nuts ⑬ securing manifold flanges to cylinder heads and then remove rear element ② and gasket ①.

SUPPORT RINGS

Verify integrity of support rings and replace them if necessary.

INSTALLATION

Fit single parts back together following removal operations in reverse sequence and paying close attention to below instructions:

a. Always fit new gaskets between manifold flanges and cylinder heads, and on flange between muffler and exhaust manifold.

b. Having completed installation, check and make sure that support rings move freely and are free of undue stress; check brackets making sure they have been properly secured.

c. While engine is running check all pipe connections for gas leaks and the whole exhaust system for unusual noises.

TROUBLESHOOTING FOR CATALYTIC MUFFLER

WARNING:
High temperature of çatalytic muffler could damage alumina monolith and consequently weaken the conversion efficiency. It could also damage the container and cause fire.

Integrate troubleshooting of basic manual as follows:

Troubles	Probables causes	Corrections
Overheating of catalytic muffler	• Scaling of one or more spark plugs	Clean or replace spark plugs
	• Clogged fuel filter	Clean or replace
	• Very dirty air filter cartridge	Replace
	• Accelerator not set properly	Effect accelerator setting
	• Engine and 'relevant accessoires not set according to specifications	Effect accelerator timing
	• Imperfect exhaust manifold tightness	Eliminate leaks
	• Battery voltage too-low (or faulty recharge system).	Recharge battery (or review the system)
	Catalytic muffler overheating could also be due to:	
	• **Fuel** level **extremely low** in tank.	Keep fuel at proper level
	• **Engine overloads** for long periods of time, i.e. maximum speed rum, drawing of trailers, or run on long hilly roads.	Avoid engine overload

SERVICE -DATA AND ~SPECIFICATIONS

For electronic injection 1.7 engines only

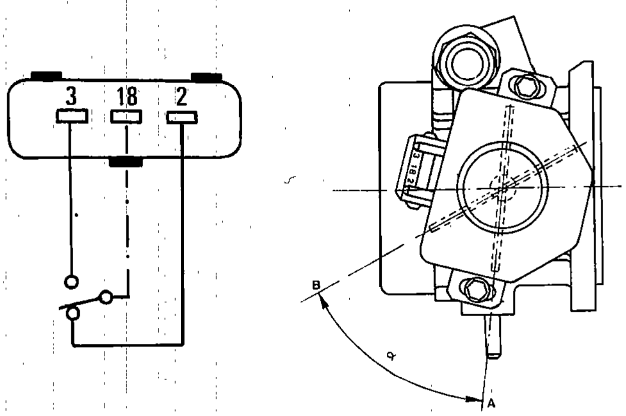
TECHNICAL DATA

Fuel tank

Features \ Measurement Unit	Litres
Overall capacity	50
Reserve	6,5

CHECKS AND TIMINGS

Accelerator throttle switch calibration

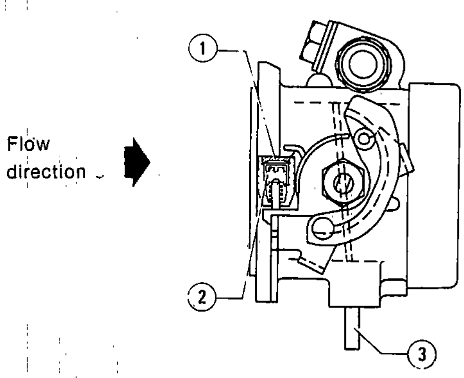


2 - Idle rpm terminal'
(corresponding to position A: closed throttle)
3 - Maximum rpm terminal
'(corresponding to position B: open throttle)

Unit:

	Resistances	
	Terminals 2-18	Teiminals 3-18
Accelerator throttle completely closed	0	ce
Accelerator throttle open at an angle ß = 60" ± 4"	∞	0

Calibration accelerator throttle body (flow)



1 Seal
2 Adjustment screw
3 Depression intake fitting

	Reading
Air blowby with throttle disk in closed position (flowmeter Solex) (1)	400 ± 10 N scale

(1) To detect plug depression intake fitting. Use **C.2.0056** buffer with **C.2.0057**.

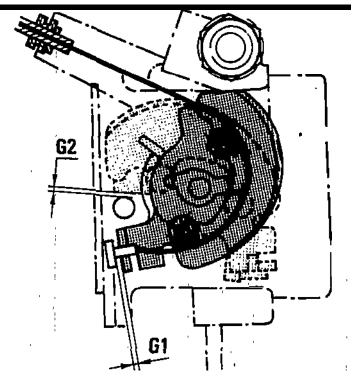
Accelerator control

Clearance between throttle control and accelerator cable pawl (with accelerator pedal at rest) to

$G_1 = 1 \div 2$ mm

Clearance between throttle control and stroke end (with accelerator pedal fully pressed) to

$G_2 = 1 \div 2$ mm



Idle rpm; emission at exhaust

Engine idle rpm (at hot engine, in neutral, clutch engaged		rpm	$950\ ^{+100}_{-50}$	850 ± 50
CC percentage at idle rpm	— total, upstream catalytic muffler with lambda probe disconnected	% in vol.	⩽ 0,8 ± 0,2	
	— total, at exhaust pipe outlet	% in vol.	⩽ 0,2	$0{,}8 \pm 1{,}7$
HC values at idle rom	— total, upstream catalytic muffler	p.p.m.	⩽ 500	
	— total, at exhaust pipe outlet	p.p.m.	⩽ 70	

(*) For models without catalytic converter

Fuel supply system

Characteristics / Measurement unit	kPa (bar; kg/cm²)
Working pressure (1)	280 ÷ 320 (2.8 ÷ 3,2; 2.9 ÷ 3,3)
Max. allowed pressure for system test	400 (4; 4.1)

(1) To be detected upstream the damper, with depression intake hose disconnected from pressure regulator.

GENERAL PRESCRIP~TIONS

FLUIDS AND LUBRIFICANTS

Application	Type	Denomination	Q.ty
Accelerator pedal spindle (on support rubber	GREASE	ISECO Molykote Longterm' n. 2 Categ. -3671-69831	—

CARBURETORS

ENGINE	Displacement		1200* - 1350		1350	
	Type		305.85 - 305.86		305.87	
CARBURETOR	ALFA ROMEO Part No.		580.981		580.852 - 580.853	580.850 - 580.851
	Model		Twin Weber 32 DIR 112/250		Twin Dellorto DRLA40FD - DRLA40FS	Twin Weber 40IDF79 - 40IDF78
	Position		1st Carb. (central)	2nd Carb.	RH LH	-RH LH
Diffuser	0	mm	23	24	·28	28
Centering device	0	MM	3.5	4.5	12189.01	3,5
Main jet	0	.	122	130	118	125
Main air jet corrector	0	.	180	170	180	190
Diffuser			F 6 8	F67	9164.01	F67
Idling jet	0	.	50		46	48
Idling air corrector	0	•	175	115	220	195
Progression holes	0	.	120 - 100 100 - 100	120-120 120	100 - 140-140 140 - 140	100- 120-130 140 - 150
Acceleration pump jet	Ø	•	50	—	35	33 (incl. 3°)
Needle valve	0	.	175		150	175
Float weight		9	l i		10	11,8
Starting jet	0	mm	—		0,80	0.90
Starting diffuser			—		7482.03	F7
Acceleration pump capacity for 20 pumps			—		7 ÷ 9	6 ÷ 9
Level of floas chamber		mm	7		5 ÷ 6	9 ÷ 9.5

(•) Dimensions in 10^{-2} mm
(*) Not marketed in all countries.

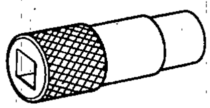
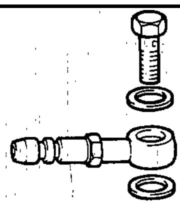
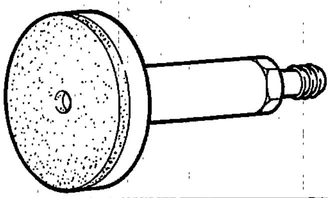
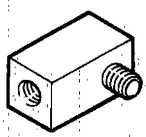
CARBURETORS

ENGINE	Displacement		1500		1700	
	Type		305.88		305.50	
CARBURETOR	ALFA ROMEO Part No.		580.778 - 580.777	580.776 - 580.775	546.860 - 546.861	546.858 - 546.859
	Model		Twin Dellorto-DRLA40FD - DRLA40FS	Twin Weber 40IDF81 - 40IDF80	Twin Dellorto DRLA40FD - DRLA40FS	Twin Weber 40IDF69 - 40IDF68
	Position		RH LH	RH LH	RH LH	RH LH
Venturi	0	mm	30	30	32	32
Centering device	0	mm	12189.01	3.5	—	—
Main jet	0	.	135	140	142	140
Main air jet corrector	0	.	205	200'	180	190
Diffuser			9164.01	F70	9164.4	
Idlino iet	0	.	46	50	52	50
Idling air corrector	Ø	•	220	195	220	195
Progression holes	0	.	100-140-140 140-140-140	100-120-130 140-150	100 - 140 - 140 140-140	106-120-130 140-150
Acceleration pump jet	0	.	35	33 (incl. 3°)	35	35
Needle valve	0	.	150	175	150	175
Float weight		g	10	11.8	10	11,8
Starting jet	0	mm	0,80	0,90	80	90
Starting diffuser			7482.03	F7	7482	F7
Acceleration pump capacity for 20 pumps			5 ÷ 7	6 ÷ 9	5,5 ÷ 6,5	528
Level of float chamber		mm	5 ÷ 6	8.5 ÷ 9.5	20 ÷ 22	

(•) Dimensions in 10^{-2}

SPECIAL SERVICE TOOLS

For electronic injection 1.7 engines only

Identification Number	Denomination	Page Reference
A.5.0212	Key for plug of exhaust gas sampling fitting of Lambda probe 	–
C.2.0051	Fitting for exhaust gas sampling of Lambda probe 	
C.2.0056	Buffer for air flow checking to be used with C.2.0057 	04-19 04-26
C.2.0057	Fitting to be used with C.2.0056 	04-19 04-26

GROUP 05

CONTENTS

(*) Refer to "WORKSHOP MANUAL Alfa 33" VOLUME I AND VOLUME II - Group 05
(••) Refer to "WORKSHOP MANUAL 33 models" - Group 05
(•) Refer to: Group 00

SERVICE DATA AND SPECIFICATIONS

TRANSISTORIZED IGNITION DISTRIBUTOR WITH NO CONTACTS AND WITH HIGH TENSION MODULE

Technical data and inspections

Engine	1200* - 1350 305.85 - 305.86	1350 1500 305.87 305.88	1700 305.50	1700 Electr. injection 305.58	1700 Electr. injection 305.58 △
Alfa Romeo	581.293	581.292	581.363	581.291	548.604
Type	Bosch 0.237.601	Bosch 0.237.601.021	Bosch 0.273.601 .017	Bosch B.237.540.173	Bosch 0.237.601.014
Firing order	I - 3 - 2 - 4				
Pulse Generator Coil Resistance Ω	1100 ± 10%				
Internal resistance of distributor rotor arm Ω	1000				
Air gap mm (in)	—				

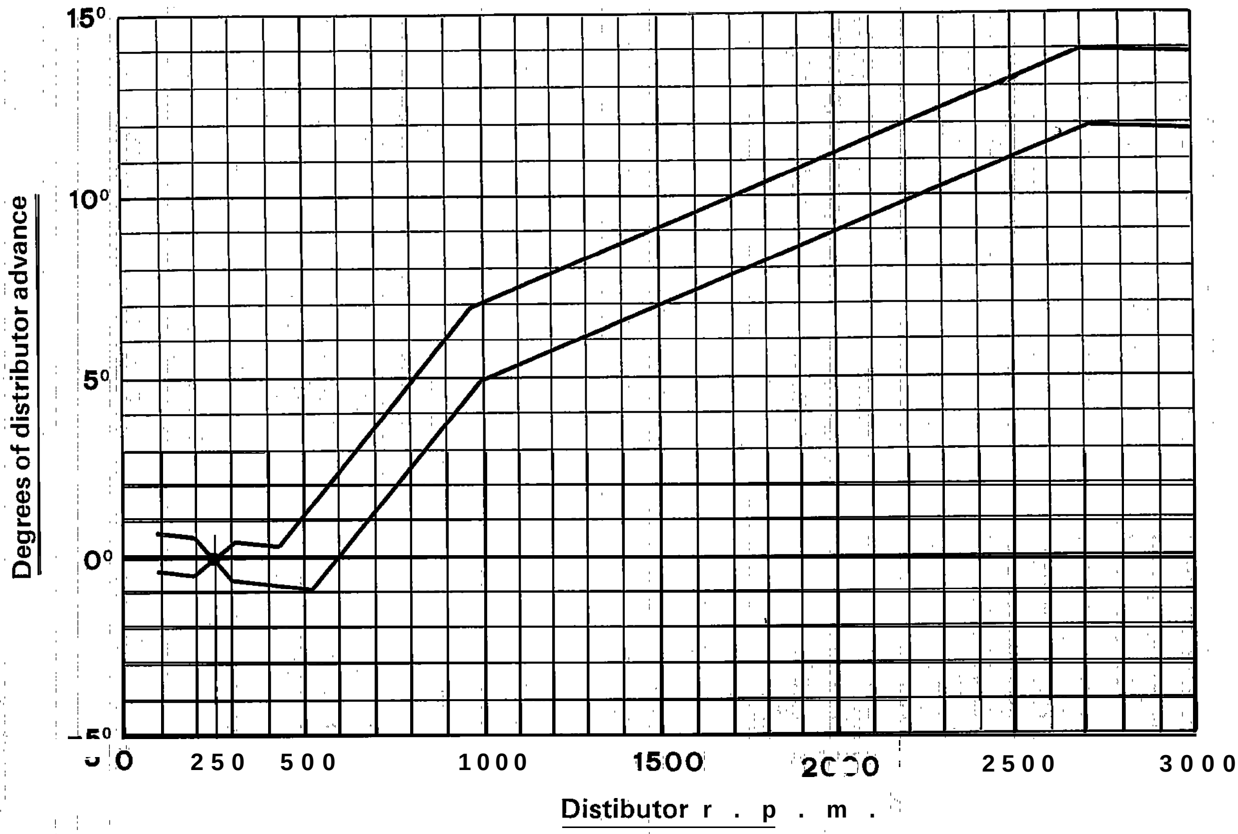
(A) For countries where antipollution regulations are in force.~

Not marketed in all countries.

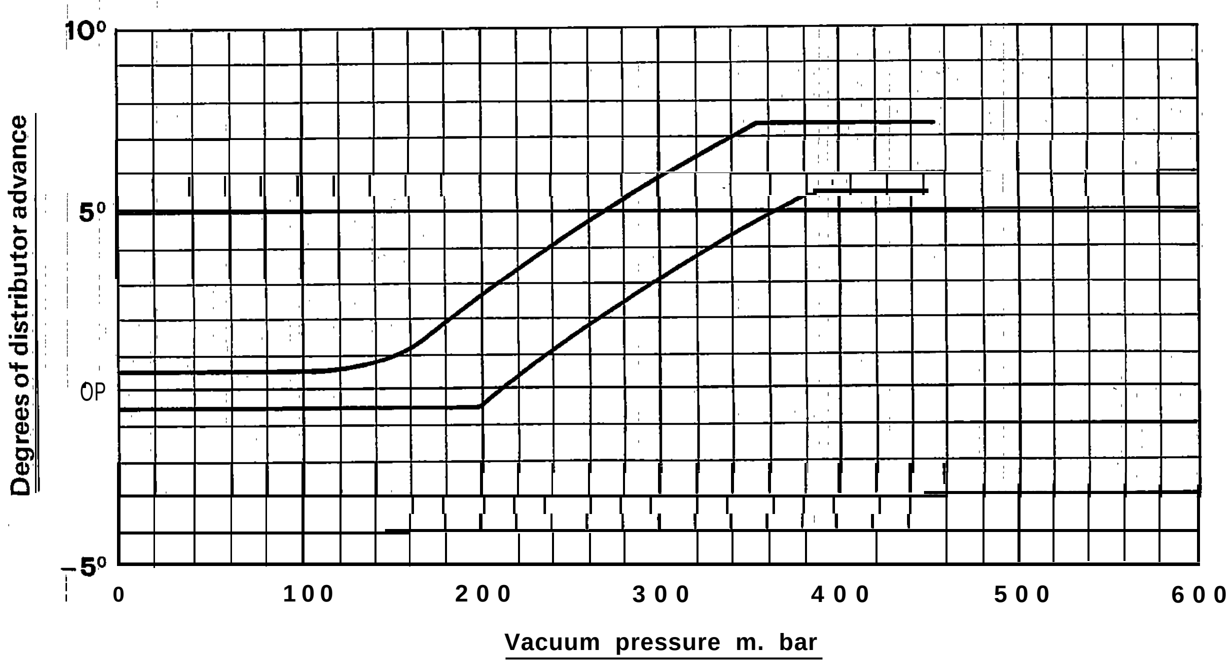
DISTRIBUTOR ADVANCE CURVES

ENGINES
1200 - 305.85
1350 - 305.86

Automatic advance curve



Vacuum pressure corrector curve



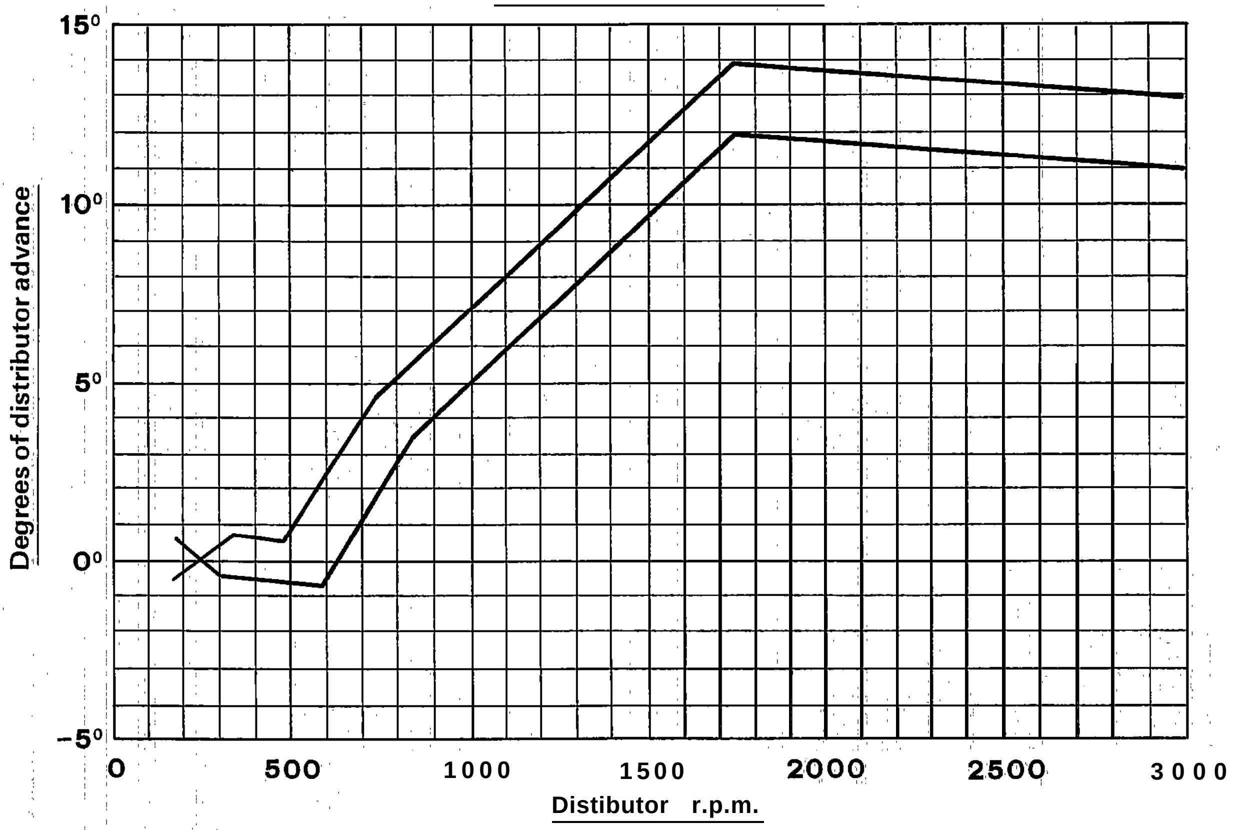
DISTRIBUTDR ADVANCE CURVES

ENGINES

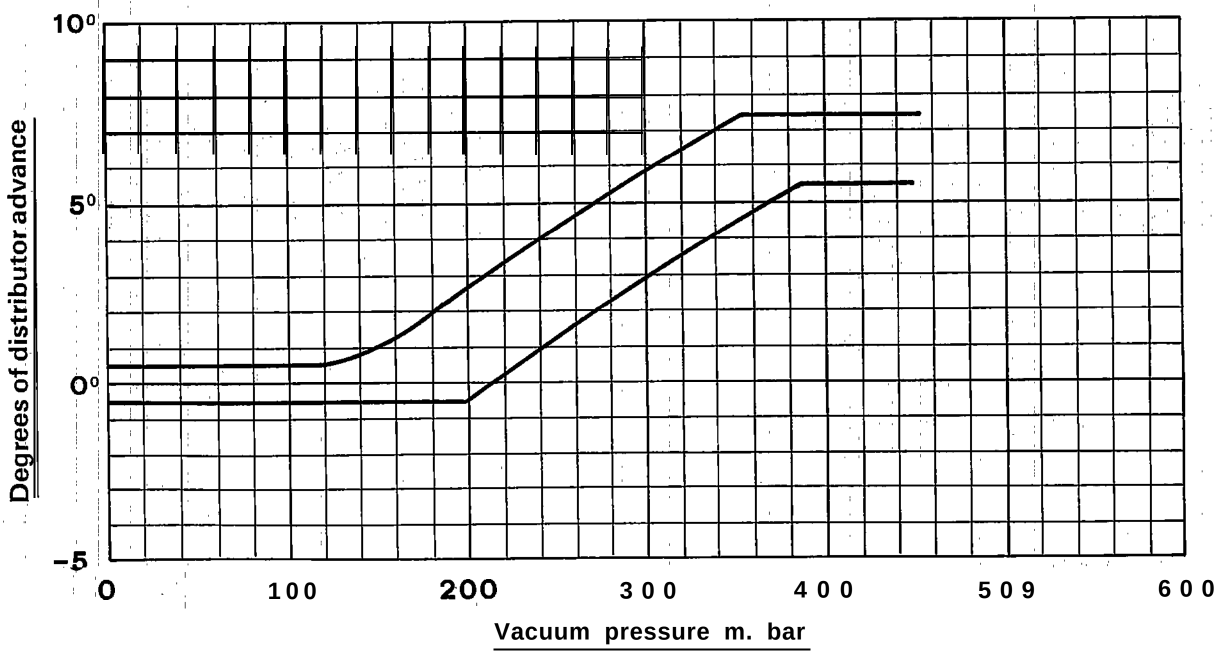
1350 - 305.87

1350 - 305.88

Automatic advance curve



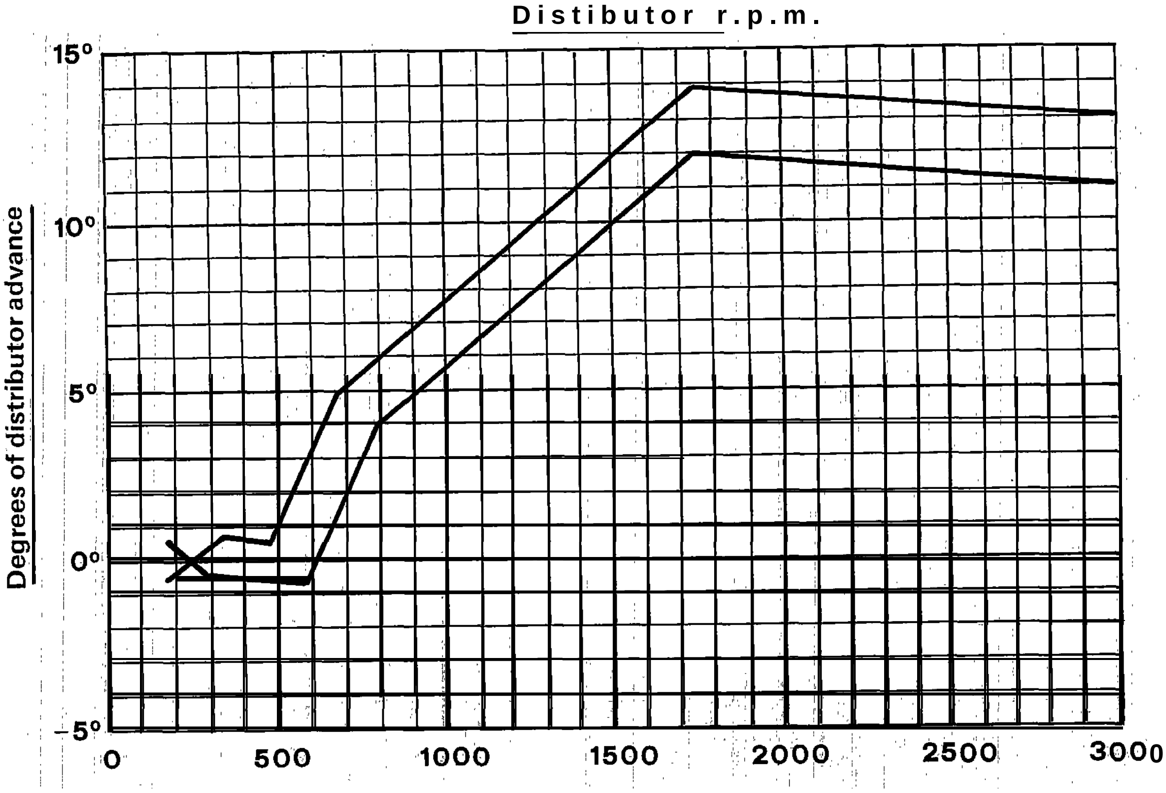
Vacuum pressure corrector curve



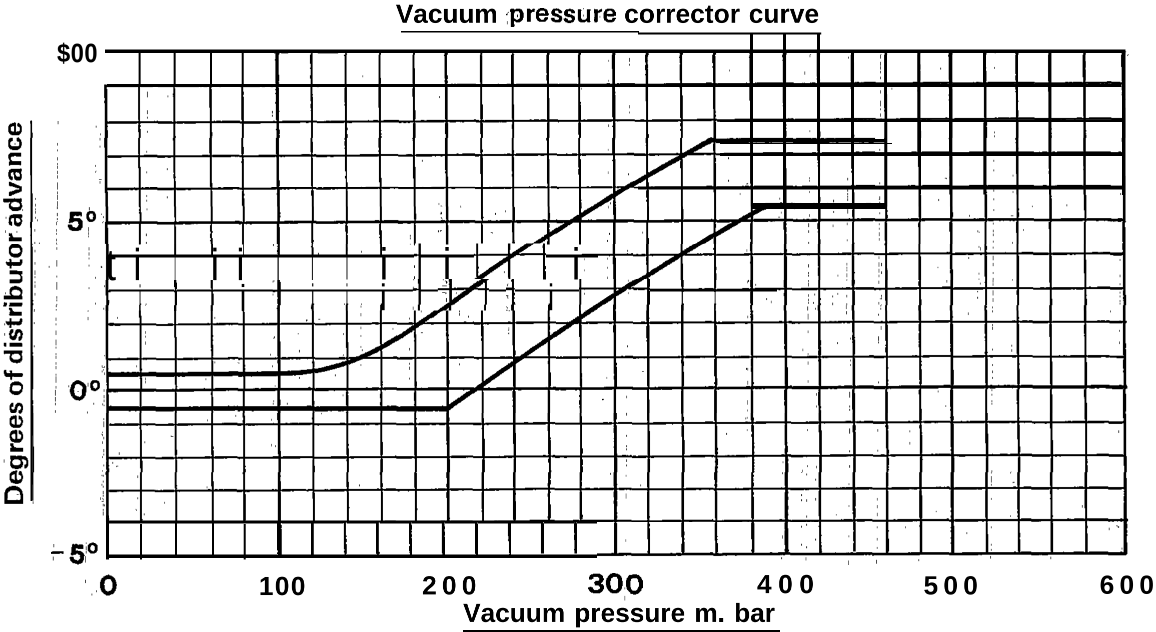
DISTRIBUTOR ADVANCE CURVES

ENGINE
1700 - 305.50

Automatic advance curve



Vacuum pressure corrector curve

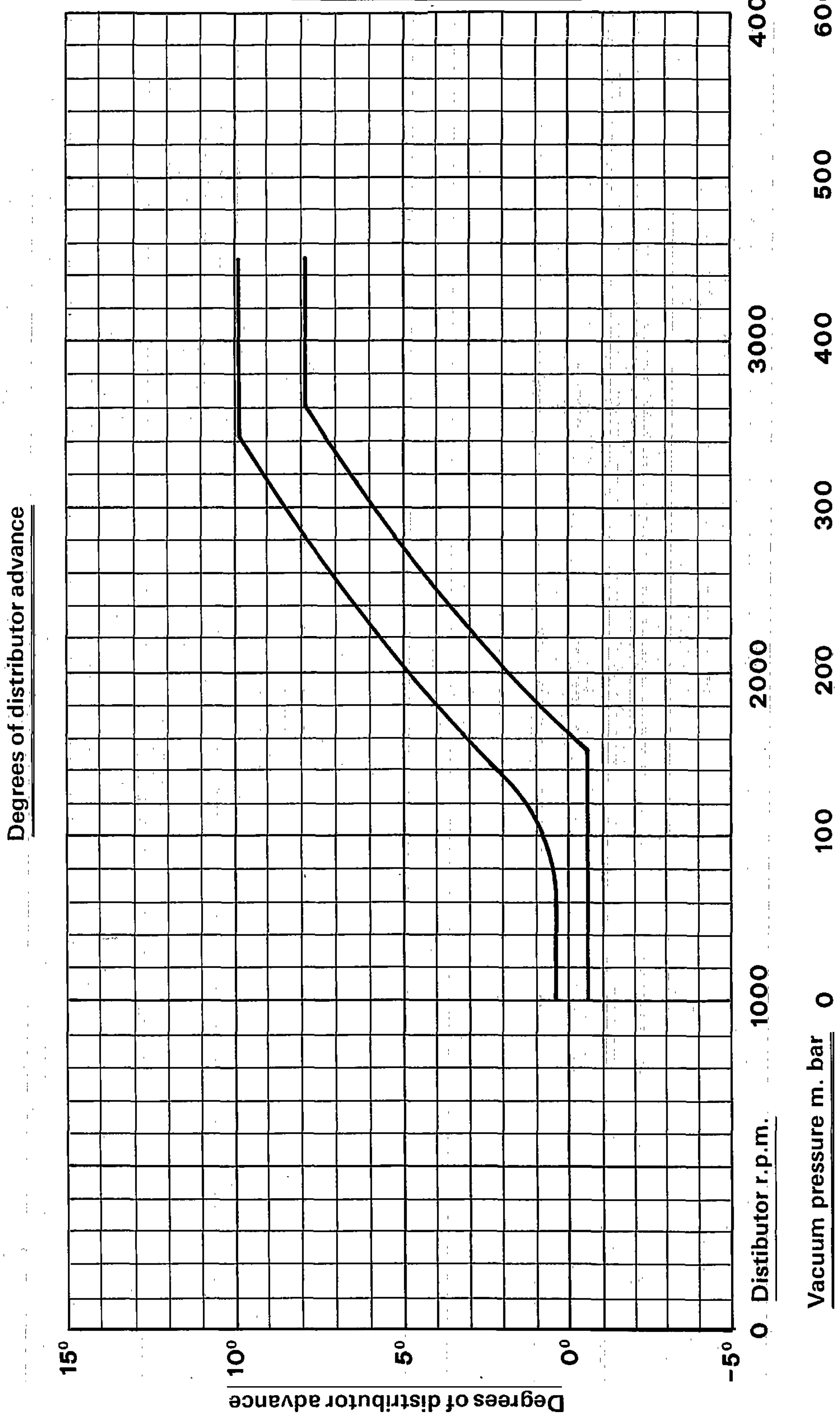


DISTRIBUTOR ADVANCE CURVES

ENGINE

1700 - 305.58

Pneumatic advance curve



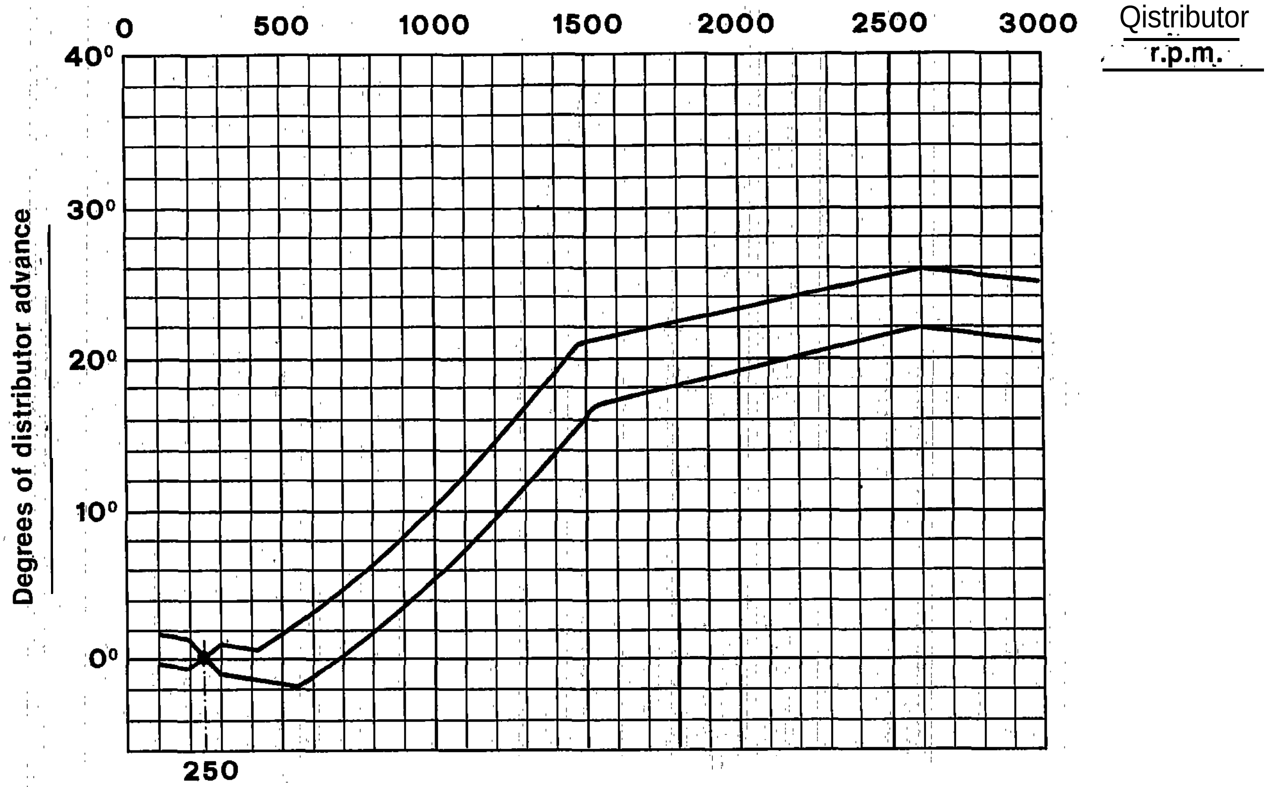
DISTRIBUTOR ADVANCE CURVES

ENGINE

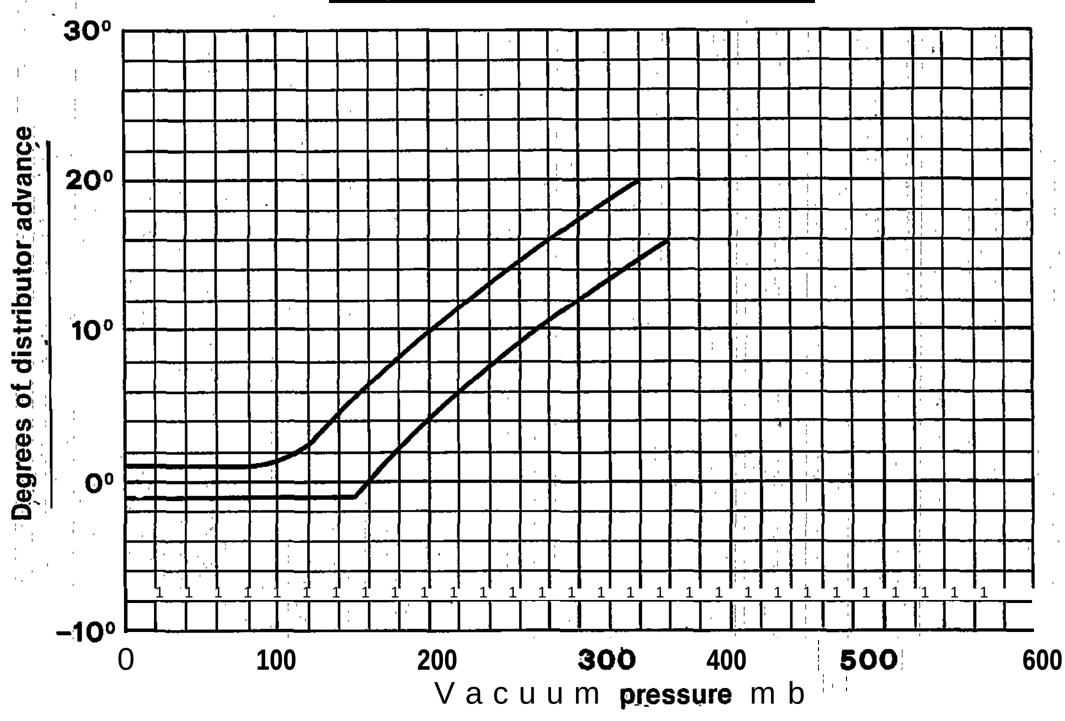
1700 · 305.58

FOR COUNTRIES WHERE ANTIPOLLUTION REGULATION ARE IN FORCE

Automatic **advance curve**



Vacuum pressure **corrector curve**



CHECKING AND ADJUSTING THE IGNITION TIMING

WARNING:
A very accurate check of the timing at idle speed has to be performed very carefully, since incorrect timing at idle greatly affects exhaust emission level which would not remain within the specified values.

For **engines with carburetors,** the procedure described in the paragraph "Check of Fixed and Maximum Advance" in the manual are to be followed taking into account the new technical data given in the table.

For the **electronic injection 1.7 engine with catalytic convertor,** the following procedure is to be followed:

1. Connect the supply terminal of stroboscopic guh to battery and the pick-up to high voltage cable of cylinder No. 1.

2. Connect an electronic rev-counter to the engine inserting the terminals on the coil power supply and the pick-up on the high tension lead of the coil.

3. Remove the plastic plug on engine rear cover.

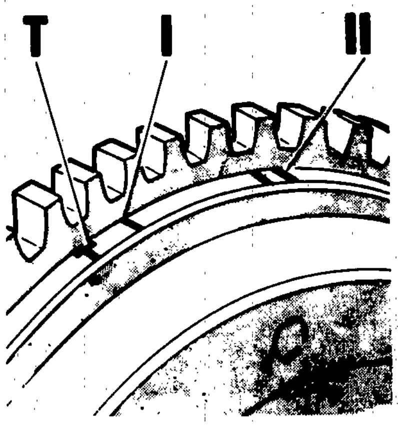
4. Start the engine, warm it up to, operating temperature.

Oil Temperature:
75 thru 80°C

5. Disconnect the vacuum advance hose from distributor; with the stroboscopic gun cgeck that at idling rpm:

950 $^{+100}_{-50}$ r.p.m.

the marker on rear cover is aligned with notch I on flywheel of the engine.



T T.D.C. of cylinder No. 1.
I Ignition advance at idle engine speed.
II Advance at 5250 rpm.

Advance (With vacuum correcting hose disconnected)
8° ± before T.D.C.

8. If specified alignment does not occur, proceed to adjust timing operating as follows:
(1) Unscrew the securing nut on the distributor.
(2) Rotate the distributor body countercklockwise to advance, or clockwise to retard the ignition setting.
(3) Retighten the distributor securing nut.
(4) Check that timing is within specified values.

7. Reconnect the vacuum advance hose to the distributor.

8. Using the stroboscopic gub, check also that at engine rpm of

5250 r.p.m.

the marker of engine rear cover is alighed with notch **II** on engine flywheel.

9. Remount the **plastic plug** on engine **rear cover.**

For the **electronic injection 1.7 engine without catalytic convertor,** the following procedure is to be followed:

1. Disconnect the minimum and maximum accelerator throttle opening switch connector and short-circuit the three wiring side plus.

2. Disconnect vacuum pressure hose from ignition distributor.

3. Check with stroboscopic gun that the advance value is 8". If this is not the case, rotate the distributor.

NOTE:
Connecting to ground those plus relative to the minimum and maximum accelerator throttle opening switch, the ou controls the coil power unit so as to dotain a fixed ignition advance value at 8° independently at engine r.p.m.

Engines / Timing (1)	1200 - 305.85 1350-305.86	1350-305.87 1500 - 305.88 1700 - 305.50	1700-305.58 A	1700-305.58
Fixed advance	8° ± 1° at 900 rpm	8° ± 1° at 900 rpm	8° ± 1° at 900 thru 1050 rpm	8° (2)
Maximum advance	34° (3) at 5500 rpm	34° at 4500 rpm	32° at 5250 rpm	—

(1) The timlng values are to be measured with the vacuum advance hose disconnected
(2) The value is measured indipendently of the engine speed
(A) For couniries where antipollution regulations are in force
(3) For an additional check, check for 30" at 4500 r.p.m.

IGNITION COIL (BREAKERLESS IGNITION)
Electrical data and checks

ENGINE			1200-305.85 1700-305.50 1350-305.86/87 1700-305.58△ 1500-305.88	1700-305.58
Alfa Romeo Class			547.811	542.162
Type			BOSCH 0.221 .122.323	BOSCH 0.221.600.002
Primary winding voltage		V	12	
Primary winding resistance	R1 (20%)	Ω	0.7 thru 1	
Primary winding resistance	R2 (20°C)	Ω	6700 thru 9600	

(△) For countries where antipollution regulations are in force.

SPARK PLUGS

Alfa Romeo class	580.020
Type	LODGE 25 HL

BATTERY

SERVICE DATA AND SPECIFICATIONS

As per **Alfa 33** except for the data given below

Engine / Battery		1200-305.85 1700-305.50	1350-305.86/87 1700-305.58	1500-305.88 1700-305.58△	1800-VM82A
Voltage	V		12		
Capacity	Ah		50 - 55 (1)		70
Discharge current	A		225 - 255 (1)		—

(△) For countries where antipollution regulations are in force.

(1) Only for engines mounted on 4x4 models and for models marketed in Sweden.

SERVICE DATA AND SPECIFICATIONS

Starter Motor

ENGINE		1200-305.85 1500-305.88	1350-305.86/87 1700-305.50		1700-305.58Δ 1700-305.58	1800-VM82A
Item	Alfa Romeo class	533.051	533.052	536.611	547.199	195.27.05.030.00
	Type	BOSCH EF 12 V - 0.8 kW 00012 11215	DUCELLIER 6246/C	MARELLI E95 - 0.9 kW 1 2 v	BOSCH EF(R) 12 V - 0.85 kW 0001208 266	BOSCH EV - 12 V - 2.2 kW
Voltage	V	12	12	12	12	1 2
On load test (pinion meshed with crown wheel with torque dynamometer) — Voltage — Absorbed current — Speed — Torque	V A rpm N - m (kg·m)	10 ⩽ 230 ⩾ 1450 5 (0.5)	10 ⩽ 200 ⩾ 1450 5 (0.5)	9.8 215 1800 5 (0.5)	—	8 ⩽ 680 ⩾ 1200 19 (1.9)
Across-line test (pinion mashed with **locked** crown **wheel**) — Voltage — Absorbed current — **Torque**	V A N . m (ft·lb) (kg·m)	8 ⩽ 400 ⩾ 10.5 (⩾ 1)	8 ⩽ 380 ⩾ 11 (⩾ 1.1)	8 400 12 (1.2)	—	4 ⩽ 1300 a 3 7 (⩾ 3.8)
Overrunning torque	N·cm (d l - n i) (kg·cm)	13 thru 22 1.3 thru 2.2	11 thru 17 1.1 thru 1.7	15 ± 3 (1.5 ± 0.3)	—	14 ± 22 1.4 thru 2.2
EM switch on starter motor — Max absorption current at rated voltage — Min pick-up voltage	A V	a 40 8	⩽ 40 ⩽ 8	55 7	—	— ⩽ 7.8
Pinion module		2.1167	2.116	2.116	—	2.1167

CHARGING

SE~RVICE DATA AND SPECIFICATIONS

ENGINE			1200-305.85 1350-305.86/7 1500-305.88 1700-305.50	1700-305.58△ 1700-305.58	1800-VM82A
Alternator	Alfa Romeo Part No.		547.949	549.399	547.565
	Type		BOSCH 0.120.489.480	BOSCH K1 (R)14V-23/65A 0.120.488.118/119	K1-14V-23/65A
Nominal Voltage		V	—	14	—
Volt& range		V	—	—	—
Current output	Max current output	A	55	65	65
	Output starts	rpm	1000 (1)	—	—
	2/3 max output	rpm	1500 (1)	—	—
	Max output	rpm	6000 (1)	—	—
Brush wear limit		mm (in)	—	—	5
Rotor winding resistance		Ω	—	—	4 ± 0.1
Voltage regulator resistance		Ω	—	—	—
Dioder resistance		Ω	—	—	0 thru 10

(1) Values read with engine at normal running temperature, at 25°C (77°F), at nominal voltage force.
For countries where antipollution regulations are in force.

FLUIDS AND LUBRICANTS
TIGHTENING TORQUES } As per Alfa 33

GROUP 07

CONTENTS

a

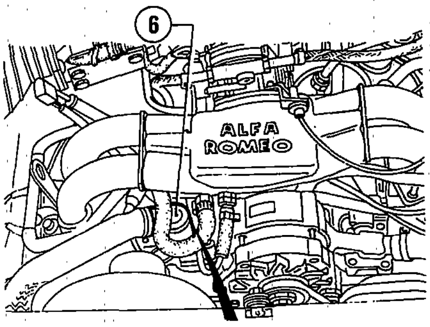
(*) See: "WORKSHOP MANUAL Alfa 33" VOLUME I - Group 07

THERMOSTAT

REMOVAL AND INSTALLATION

1. Drain coolant of cooling system into a suitable container.
2. Disconnect hose ① from thermostat ②.
3. Unscrew screw fixing thermostat to engine block.
4. Disconnect tubes ②, ③, ④, and ⑤ from thermostat, then remove it.

5. Proceed to installation by operating in reverse order of removal, then fill system with specified coolant.
6. Start engines for few minutes and check that no coolant leaks occur.



1 Coolant delivery hose to radiator
2 Tube connecting thermostat-RH. manifold
3 Tube supplying coolant to radiant
4 Tube connecting thermostat-L.H. manifold
5 Tube connecting thermostat to filler tube
6 Thermostat

CHECKS AND INSPECTIONS

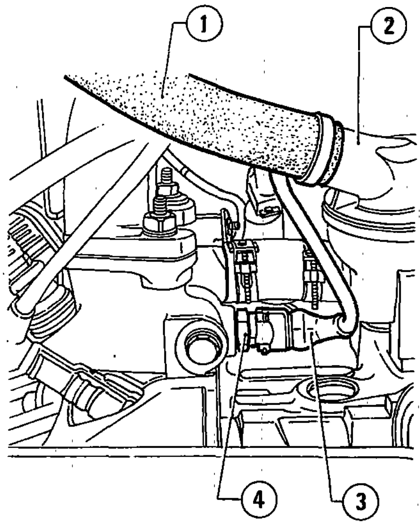
Using suitable tools, check that initial thermostat opening occurs at a fluid temperature of:
64 thru 88°C
Otherwise replace thermostat.

COOLANT TEMPERATURE SENSOR (FOR INJECTION CU)

For electronic injection 1.7 engines only

REMOVAL AND INSTALLATION

1. Drain coolant of cooling system Into a suitable container.
2. Disconnecti sleeve ① from thermostat ②.
3. Disconnect connector ③.
4. unscrew sensor ④ and remove it from the R.H. feed manifold.



1 Coolant delivery hose to radiator
2 Thermostat
3 Connector
4 Coolant sensor (for injection CU)

5. Proceed to installation by operating in reserve order to removal, tightening sensor to a torque of not more than: 15 N.m (1.5 kg.m)
6. Refill system with specified coolant.

SERVICE DATA AND SPECIFICATIONS

GENERAL DATA

As per **Alfa 33** except for:

Min. external temperature °C (°F)	−15 (+5)	−20 (−4)	−35 (−31)
Antifreeze cat. 3681-69956 l (Imp. gall.)	2.2 (0.48)	2.6 (0.57)	3.65 (0.80)
Fresh water l (Imp. gall.)	5.1 (1.12)	4.7 (1.03)	3.65 (0.80)
Antifreeze ready for use cat. 3681-69958 l (Imp. gall.)	—	7.3 (1.60)	—

CAUTION:
Product harmful to paint.
Avoid contact with painted parts.

TIGHTENING TORQUES

Item / Unit of measurement	N·m	Kg·m
Electric fan control thermal contact on radiator	29 thru 34	3 thru 3.5
Cooling temperature transmitter on feed manifold	33 thru 41	3.4 thru 4.2
Water pump securing screws	19 thru 24	1.9 thru 2.4
Coolant level sensor for injection CU (max. torque)	15	1.5

GROUP 13

CONTENTS

(*) Refer to "WORKSHOP MANUAL Alfa 33" VOLUME I and VOLUME II - Group 13.

GEARBOX OUTER LINKAGE

As per Alfa 33 Volumes I and II **except** for the following **procedures.**

REAR WHEEL DRIVE SE LEGTOR

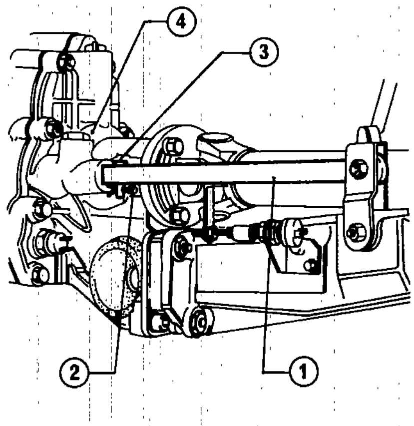
4 x 4 **version**

Disassembly

Place thé gearbox - differential - propeller shaft group on a stand fitted with suitable support brackets, and proceed to dismantle the rear wheel drive selector in the following wav.

1 Remove the retainer split pin ② of the stud ③ connecting the rear wheel drive selector bar ① and the corresponding rod. Remove the stud.

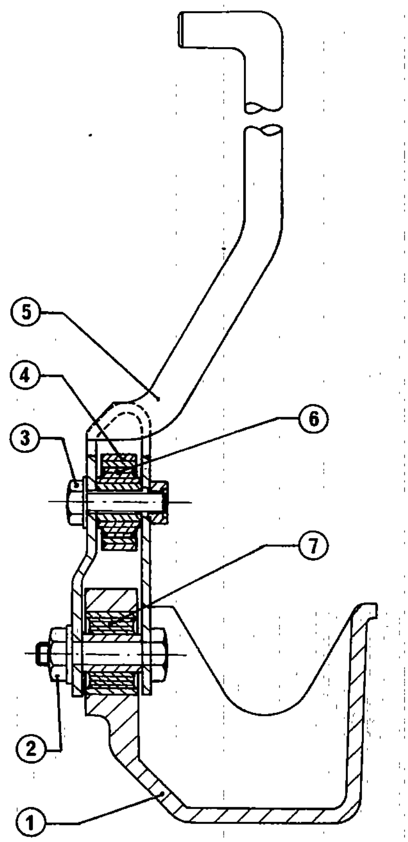
The split pin must not be reused.



1 **Rear wheel drive selector bar**
2 **Split pin**
3 **Stud**
4 **Rear cover**

2. Unscrew bolt ② connecting rear wheel drive selector lever ⑤ and lever support ①.

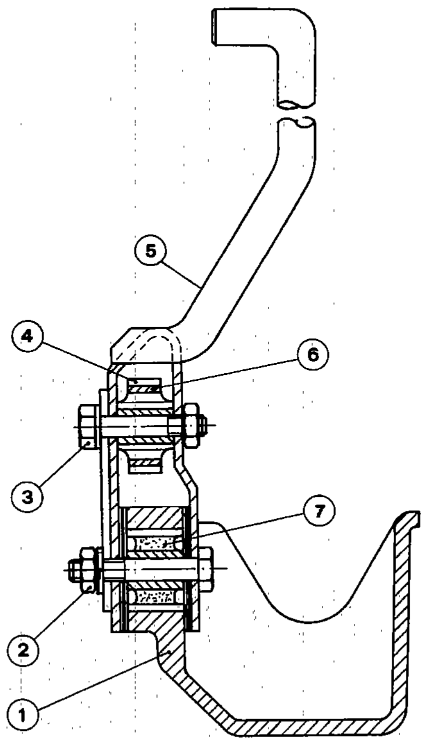
Remove lever **and if necessary the** silentblock ⑦ from lever support.



1 **Lever support**
2 **Bolt**
3 **Screw**
4 **Rear wheel drive selector bar**
5 **Rear wheel drive selector lever**
6 **Silentblock**
7 **Silentblock**

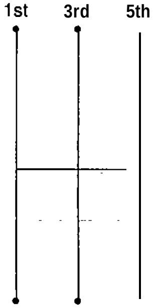
3. Loosen screw ③ **connecting** rear wheel drive selector lever ⑤ **and** corresponding bar ④.

If necessary remove the silentblock ⑥ from the bar.



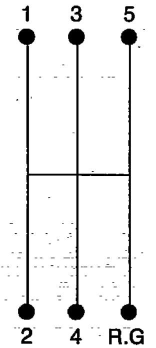
Inspections and checks
Check that the silentblocks situated on linkage articulated joints are in **good** condition; replace them if necessary.,

Assembly
Go on assembling rear drive selector following disassembly procedure in reverse sepuence.

Characteristics / Models			33 ● *		33 1.3 33 1.3 S		33 1.7 ●		33 1.5 TI 33 1.5 4x4 33 1.7 IE 33 1.7 ● △		33 1.8 TD	
			Crown gear and pinion ratio									
			9/35		9/37		10/37		9/35		11/35	
Speed selector lever positions	Gear	Gearbox ratio	Overall ratio	Speed at 1000 r.p.m	Overall ratio	Speed at 1000 r.p.m	Overall ratio	Speed at 1000 r.p.m	Overall ratio	Speed at 1000 r.p.m	Overall ratio	Speed at 1000 r.p.m.
	1st	1:3,143	—		1:12,921	8,010	1:11,629	9,081	1: 12,220	8,641		
	2nd	1:1,864			1: 7,663	13,506	1:6,897	15,311	1: 7,247	14,571		
	3rd	1:1,323			1: 5,439	19,029	1:4,895	21,573	1:5,144	20,529		
	4th	1:1,027			1:4,222	24,514	1:3,800	27,790	1:3,993	26,446		
	5th	1:0,854			1:3,511	29,479	1:3,160	33,418	1:3,320	31,807		
	R.G.	1: 2,091			1: 12,707	8,145	1:11,437	9,233	1:12,018	8,787		
	1st	1:3,750	1:14.58	7.099	—						1:11,932	8,850
	2nd	1:2,050	1:7.97	12.986							1:6,523	16,189
	3rd	1:1,387	1: 5.393	19.191							1:4,413	23,930
	4th	1:1,027	1:3.993	25.920							1:3,268	32,313
	5th	1:0,825	1:3.208	32.263							1:2,625	40,228
	R.G.	1:3,091	1:12.018	8.612							1:9,835	10,737

(A) Electronic injection engine
(*) Noi marketed in all countries with 1.2 engine

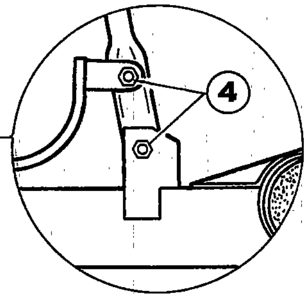
TECHNICAL DATA

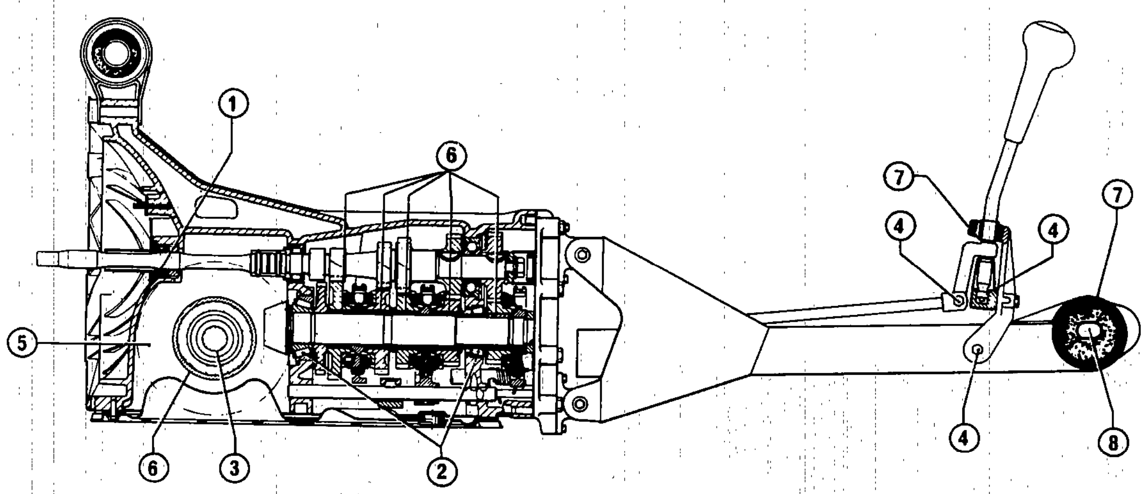
Features \ Model			Sport Wagon 33 1.3 S		Sport Wagon 33 1.7 ⊕		Sport Wagon 33 1.5 4x4		Sport Wagon 33 1.7 ⊕ Δ / 33 1.7 4x4 Δ		Sport Wagon 33 1.8 TD	
			Crown gear ancl pinion ratio									
			9/37		10/37		[9/35 (1)				11/35	
Speed seiector lever position	Gear	Gearbox ratio	Gearbox differential)verall ratio	Speed at 1,000 r.p.m. Km/h	Gearbox differential overall ratio	Speed at 1,000 r.p.m. Km/h	Gearbox differential overall ratio	Speed at r.p.m. Km/h	Gearbox fifferential verall ratio	Speed at r.p.m. Kmlh		
	1st	1 : 3,143	1 : 12,921	6.010	1 : 11,629	9,081	1 : 12,220	8,641	1 : 12,220	8,641	–	
	2nd	1 : 1,864	1 : 7,663	13,506	1 : 6,897	15,311	1 : 7,247	14,571	1 : 7,247	14,571		
	3rd	1 : 1,323	1 : 5,439	19,029	1 : 4,895	21,573	1 : 5,144	20,529	1 : 5,144	20,529		
	4th	1 : 1,027	1 : 4,222	24,514	1 : 3,800	27,790	1 : 3,993	26,446	1 : 3,993	26,446		
	5th	1 : 0,854	1 : 3,551	29,479	1 : 3,160	33,418	1 : 3,320	31,807	1 : 3,320	31,807		
	R.G.	1 : 3,091	1 : 12,707	6,145	1 : 11,437	9,233	1 : 12,018	8,787	1 : 12,018	8,787		
							Crown gear and pinion ratio 9/37					
	1st	1 : 3,750	–				1 : 15,416	6,850	–		1 : 11,932	8,850
	2nd	1 : 2,050					1 : 8,427	12,531			1 : 6,523	16,189
	3rd	1 : 1,387					1 : 5,702	18,520			1 : 4,413	23.930
	4th	1 : 1,027					1 : 4,222	25,012			1 : 3,268	32,313
	5th	1 : 0,825					1 : 3,391	31,141			1 : 2,625	-40,228
	R.G.	1 : 3,091					1 : 12.707	8,310			1 : 9,835	10.737

(A) With electronic injection engine for countries where antipollution regulations are in force.
(1) Post modification, from chassis.

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS





App. no.	Application	Type	Name	Q.ty
	Inner surface of: – Seal ring of main selector rod – Seal ring of primary shaft – Seal ring of differential shaft – Seal lip and work seat on shaft	GREASE	ISECO Molykote BR2 Std. No. 3671-69841	–
	Outer surface of: – Seal rings	OIL	See item 5	–
	Outer races of differential casing and pinion taper roller bearings	GREASE	AGIP: F1 Grease 33 FD Std. No. 3671-69833	–
	Mating surfaces of: – Ring nut securing bearing to differential sha	OIL	See item 5	–

GROUP 21

CONTENTS

Refer to Group 00 - Chassis and Body Maintenance for:

- **Checking Suspension Height**
- **Wheel Alignment**

(*) Refer to: "WORKSHOP MANUAL Alfa 33" VOLUME I and VOLUME II - Group 21

21

SERVICE DATA AND SPECIFICATIONS

TECHNICAL DATA

COIL SPRING, SHOCK ABSORBER AND ANTI-ROLL BAR

Features		Model: Sport Wagon — Versions: 33 1.3 S	33 1.7 ⊕ / 33 1.7 ⊕ △	33 1.5 4x4 / 33 1.7 4x4 △	33 1.8 TD
Coil spring	Alfa Romeo Part No.	131883			133018
	Wire diameter mm (in)	13.2 (0.520)			13.6 (0.53)
	Coil diameter mm (in)	160 (6.299)			
	Free length mm (in)	310 (12.205)			333 (13.11)
	Stiffness N/mm (kg/mm) (lb/in)	21.6 (2.2) (123.2)			24.5 (2.5)
Shock absorber	Type	SPICA			
		BOGE			
		HYDRAULIC			
	Piston rod diameter mm (in)	20 (0.787)			
	Stroke mm (in)	196 (7.716) (1) 187 (7.36:) (2)			185 (7.283)
Anti-roll bar	Alfa Romeo Part No.	–	1'31835		
	Diameter mm (in)		18		

(1) For shock absorber SPICA only
(2) For shock absorber BOGE only

INSPECTION AND ADJUSTMENT

DATA OF SHOCK ABSORBER SETTING

Features		Model: Sport Wagon — Versions: 33 1.3 S / 33 1.7 ⊕ / 33 1.7 ⊕ △ — 33 1.5 4x4 / 33 1.7 4x4 △				33 1.8 TD			
SHOCK ABSORBER		LH	RH	LH	RH	LH	RH	LH	RH
TYPE		SPICA		BOGE		SPICA		BOGE	
Alfa Romeo part number		548190	548191	549123	549122	549301	549300	581041	581047
Low speed	Compression N (kg)	260±40 (26,5±4)		156,9±40 (1614)		255±40 (26,5±4)		260±50 (25,5±5)	
	Expansion N (kg)	510±40 (52±4)		392,3±40 (40±4)		510±40 (52±4)		490 $^{+100}_{-80}$ (49,9 $^{+10,2}_{-8,1}$)	
High speed	Compression N (kg)	490±40 (49,9±4)		529,5±40 (54±4)		491±40 (50±4)		490±50 (49,9±5)	
	Expansion N (kg)	1280±40 (130,5±4)		1421,9±40 (145±4)		1275±40 (130±4)		1650±150 (168,2±15,3)	

(A) With electronic injection engine for countries where antipollution regulations are in force.,
NOTE: The shock absorbers are integrated in their strut tubes.

INSPECTION AND ADJUSTMENT

DATA OF SMOCK ABSORBER SETTING

Features \ Versions			33 ♣ * 33 1.3 33 1.3 S 33 1.7 IE 33 1.7 IE △		33 1.5 TI 33 1.5 axa 33 1.7 ♣ 33 1.7 ♣ A		33 1.8 TD	
SHOK ABSORBER			LH	RH	LH	RH	LH	RH
Type			BOGE		BOGE		BOGE	
Alfa Romeo part number			581045	581044	549123	549122	581046	581047
Low speed	Compression	N (kg)	150^{+40}_{-30} $(15{,}3^{+4}_{-3})$		157 ± 40 (16 ± 4)		250 ± 50 (25,5 ± 5)	
	Expansion	N (kg)	330^{+80}_{-60} $(33{,}6^{+8.1}_{-6.1})$		392 ± 40 (40 ± 4)		490^{+100}_{-80} $(49{,}9^{+10{,}2}_{-8.1})$	
High speed	Compression	N (kg)	460 ± 60 (46.9 ± 6.1)		530 ± 40 (54 ± 4)		490 ± 50 (49,9 ± 5)	
	Expansion	N (kg)	1480 ± 130 (150,9 ± 13,2)		1422 ± 40 (145 ± 4)		1650 ± 150 (168,2 ± 15,3)	

Features \ Versions			33 ♣ * 33 1.3 33 1.3 5 33 1.7 IE 33 1.7 IE △		33 1.5 TI 33 1.5 axa 33 1.7 ♣ 33 1.7 ♣ △		33 1.8 TD	
SHOK ABSORBER			LH	RH	LH	RH	LH	RH
Type			SPICA		SPICA		SPICA	
Alfa Romeo part number			548615	548614	548190	549191	549300	549301
Low speed	Compression	N (kg)	186 ± 40 (19 ± 4)		260 ± 40 (26,5 ± 4)		255 ± 40 (26 ± 4)	
	Expansion	N (kg)	265 ± 40 (27 ± 4)		510 ± 40 (52 ± 4)		510 ± 40 (52 ± 4)	
High speed	Compression	N (kg)	461 ± 40 (47 ± 4)		490 ± 40 (49.9 ± 4)		491 ± (50 ± 4)	
	Expansion	N (kg)	1216 ± 40 (124 ± 4)		1280 ± 40 (130.5 ± 4)		1275 ± 40 (130 ± 4)	

NOTE: The shock absorbers are 'integrated in their strut tubes
(*) Not marketed in all countries with 1.2 engine.
(△) With electronic injection engine for countries where antipollution regulations are in force.

GROUP 22

CONTENTS

(*) Refer to "WORKSHOP MANUAL Alfa 33" VOLUME I and VOLUME II – Group 22

22

SERVICE DATA AND SPECIFICATIONS

TECHNICAL DATA

FRONT BRAKES

Calipers, brake pads and discs

Features \ Versions				33 * * 33 1.3 33 1.3 S 33 1.5 TI 33 1.7 IE 33 1.5 4x4 33 1.7 IE 33 1.8 TD	△ 33 1.7 * 33 1.7 * A
Calipers	Type	ATE	Part No.	547168/9	547808/9
		DBA	Part No.	54717819	—
Brake pads	Type	ATE	Part No.	795357	720402
		DBA	Part No.	795356	—
	Colours			LIGHT BLUE (FRENDO) BLACK (FERODO)	
	Pad nominal thickness "S"		mm (in)	15	16,5
Discs	External diametar		mm (in)	239	
	Nominal thickness "C"		mm (in)	$12{,}7^{-0{,}2}$	$22^{-0{,}2}$

(*) Not marketed in all countries with 1.2 engine.

(△) With electronic injection angine for countries where antipollution regulations are in force.

REAR BRAKES

Unit: mm (in)

Drum nominal diameter :	9"	8"
Part No.	130.695	131245
Drum nominal interna! diameter	228,6 + 0.2	203.2 $^{-0,1}_{+0,2}$
Brakelining thicknass	5	5

SERVOBRAKE

Type: BENDITALIA or ATE Diameter of working cylinder	7 in

BRAKE MASTER CYLINDER

Type: BENDITALIA Diameter Stroke	Part No. 546.657 20.64 mm (0.812 in) 32 mm (16+16) 1.26 in (0.63 + 0.63)
Type: ATE Diameter Strbka	Part No. 548.682 20.64 mm (0.812 in) 32 mm (17 +15) 1.26 in (0.67 +0.59)

BRAKE PRESSU#RE PROPORTIONING VALVE,

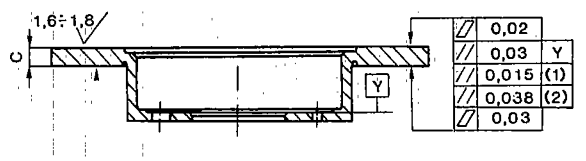
Type	BENDITALIA	Part	No. 544.498
RATIO			0.36

INSPECTION AND ADJUSTMENT

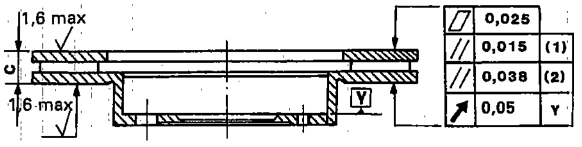
FRONT BRAKES

Dimensions for brake disc grinding (single or ventilated)

single



vantilated



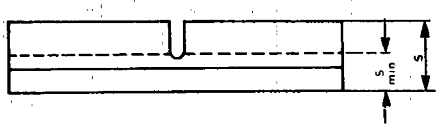
(1) Circumferential
(2) Radial

Braka disc thicknass

Unit: mm (in)

Braka disc	Single	Ventilated
Thickness:		
C_{min} after machining	10 (0.394)	21 (0.827)
C_{min} serviceability thicknass	9 (0.354)	20.2 (0.795)
Max disc banking	0.03(0.00118)	0.03.(0.00118)

Braka pad thickness



Unit: mm (in)

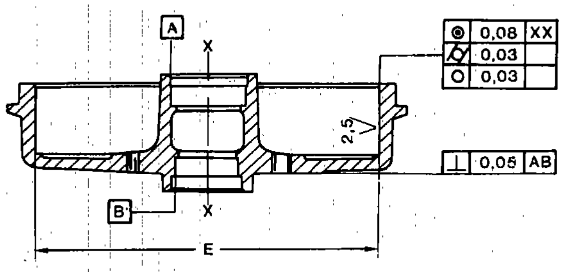
Brake pat	Single	Vantilatad
Thickness:'		
S	15.15 (0.596)	16.5 (0.650)
S min. (wear limit or min. serviceability thickness)(*)	7 (0.276)	7 (0.276)

(*) Serviceability limit is determined, anyway, by the lighting up of brake pad waar warning lamp

REAR BRAKES

As per **Alfa 33** except:

Dimensions for brake drum turning



Unit: mm (in)

Drum nominal diameter	9"	8"
E_{max} after turning	229.1 (9.02)	204 (8.03)
E_{max} serviceability limit dimension,	229.6 (9.04)	204.5 (8.05)
Roundness error	< 0.03 (0.00118)	< 0.03 (0.00118)
Concentricity error	< 0.08 (0.00315)	< 0.08 (0.00315)
Brake shoe lining min. thickness (wear or serviceability limit)	0.5 (0.0197)	

BRAKE -PRESSURE PROPORTIONING VALVE

Adjustment

Drum nominal diameter	
9"	8"
— Vehicle at nominal height : one passenger and tank filled up — Valve piston at end of travel	
— Apply a load of 49 N (5 kg ; 11.02 lb) to the rocker hook	— Apply a load of 78.4 N (8 kg; 17.64 lb) to the rocker hook

HANDBRAKE LEVER ADJUSTMENT

Number of free notches on the sector gear before wheels locking — 1 ÷ 3

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS

Application	Type	Denomination
Refilling of brake Fluid system	Fluid	Std No. 3681-69906 AGIP brake fluid DOT 4 Std No. 3681-69906 IP Auto Fluid FR DOT 4 Std No. 3681-69906

GROUP 22

CONTENTS

(*) Refer to: "WORKSHOP MANUAL Alfa 33"
VOLUME I and VOLUME II - Group 22

FRONT BRAKES

Calipers, brake pads and discs

Features			Model / Versions	Sport Wagon 33 1.3 S	33 1.7 ⊕ 33 1.7 ⊕ Δ	33 1.5 4×4 33 1.7 4×4 Δ	33 1.8 TD
Callpers	Type	ATE	part. No.	5471 68/9	54780819	54716819	
		DBA	part. No.	54717819		54717819	
Brake	Type	ATE	part. No.	795357	720402	795357	
		DBA	part. No.	795356		795356	
	Colours			LIGHT BLUE (FRENDO) BLACK (FERODO)			
	Pad nominal thickness "S"		mm (in)	15	16,5	1,5	
~Discs	External diameter		mm (in)	239			
	Nominal thickness "C"		mm (in)	12.7-O.’ ($0.5^{-0.008}$)	$22^{-0.2}$ ($0.5^{-0.008}$)	12.7-O.” ($0.5^{-0.008}$)	

(A) With electronic injection engine for countries where antipollution regulations are in force.

REAR BRAKES

Unit: mm (lb)

Drum nominal diameter:	9" *	8"
Part No.	130.895	131.245
Drum nominal internal diameter	228.6+0,2	$203.2^{-0,1}_{+0,2}$
	(9+7.9 10^{-3})	($8^{-3.9 \cdot 10^{-3}}_{+7.9 \cdot 10^{-3}}$)
Brake lining thickness	5 (0.197)	5 (0.197)

(*) Only for 4x4 versions

BRAKE MASTER CYLINDER

Type~ Diameter Stroke	BENDITALIA	Par-t. No. 548.857 20:64 mm (0.812 in) 32 mm (16+16) 1.28 in (0.63+0.63)
Type: Diameter Stroke	ATE	Part. No. 548.882 20.64 mm (0.812 in) 32 mm (17+15) 1.28 in (0.67+0.59)

SERVOBRAKE

TYPE: ATE or BENDITALIA Diameter of working cylinder	7 in

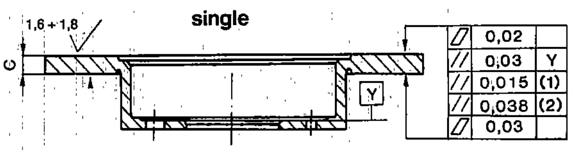
BRAKE PRESSURE PROPORTIONING VALVE

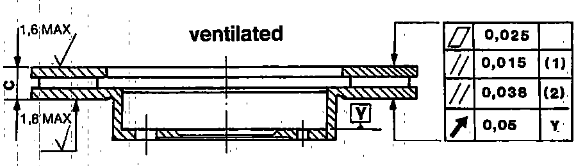
Type: BENDITALIA RATIO	Part No. 544.498 0.38

INSPECTION AND ADJUSTMENT

FRONT 'BRAKES

Dimensions for brake disc grinding (single or ventilated)





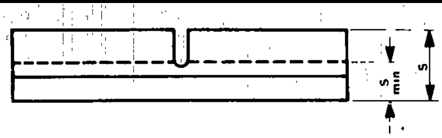
(1) Circumferential
(2) Radial

Brake disc thickness

Unit: mm (in)

Brake disc	Single	Ventilated
Thickness:		
C_{min} after machining	10 (0.394)	21 (0.827)
C_{min} serviceability thickness	9 (0.354)	20.2 (.795)
Max disc banking	0.03 (0.00118)	0.03 (0.00118)

Brake pad thickness



Unit: mm (in)

Brake disc	Single	Ventilated
Thickness:		
S	15.15 (0.596)	16.5 (0.850)
S min. (wear limit or min. serviceability thickness) (3	7 (0.278)	7 (0.278)

(*) Serviceability limit is in any case determined by the lighting up of brake pad wear warningi lamp.

GROUP 25

CONTENTS

(*) Refer to "WORKSHOP MANUAL Alfa 33 "VOLUME I and VOLUME II – Group 25

25

SERVICE DATA AND' SPECIFICATION

TECHNICAL DATA

COIL SPRING AND SHOCK ABSORBER

Features \ Versions		33 Δ * 33 1.3 33 1.3 S 33 1.5 TI 33 1.7 IE 33 1.7 IE A	33 1.7 Δ 33 1.7 Δ A	33 1.8 TD	33 1.5 a x a
Coil Springs	Alfa Romeo Part No.	130938	131805	131990	
	Wire diameter mm	11,5 ± 0,1	11,2 ± 0,05	11,8 ± 0,1	
	Coil diamete'r mm	111			
	Free length mm	310'	302	313	
	Stiffness N/mm (kg/mm)	21,3 (2,17)	23,1 (2.35)	23,4 (2.39)	
I e	Static load h mm	204			
Shock absorbers	Type	Boge			
		Hydraulic			
	Piston rod diameter mm	12 (1), 11 (2)			
	Stroke mm	180 (1) 144 (2)			180 (1) 132 (2)

INSPECTION AND ADJUSTMENT

DATA OF SHOCK ABSORBER SETTING

Features \ Versions		33 Δ * 33 1.3 33 1.3 S 33 1.5 TI	33 1.7 Δ 33 1.7 IE A 33 1.7 Δ A 33 1.7 IE 33 1.8 TD	33 1.5 a x a	
Shock absorber type		BOGE	SPICA	BOGE	SPICA
Alfa Romeo Part Number		581.052	549.141	549.134	549.142
Low speed	Compression N (kg; lb)	100'40 (10,2 ± 4)	220 ± 40 (22.4 ± 4)	117 ± 40 (12 ± 4)	180 ± 40 (18,4 ± 4)
	Extension N (kg; lb)	90 ± 40 (9.2 ± 4)	200 ± 40 (20,4 ± 4)	157 ± 40 (16 ± 4)	200 ± 40 (20,4 ± 4)
High speed	Compression N (kg; lb)	400 ± 50 (40.7 ± 5)	520 ± 40 (53 ± 4)	451 ± 50 (46 ± 5)	520 ± 40 (53 ± 4)
	Extension N (kg; lb)	730 ± 75 (74,4 ± 7,6)	1160 ± 40 (118,3 ± 4)	211 ± 78 (21,5 ± 8)	1160 ± 40 (118,3 ± 4)

NOTE: Values to be measured with shock absorbers at 20 ± 2°C (68 ± 3.6°F) temperature.
(*) Not marketed in all countries with 1.2 engine.
(Δ) With electronic injection engine for countries where antipollution regulations are in force.

GROUP 25

CONTENTS

Refer to Group 00 - Chassis and Body Maintenance for:

- **Checking Rear Suspension Height**

**(*) Refer to: "WORKSHOP MANUAL Alfa 33"
VOLUME I and VOLUME II - Group 25**

SERVICE DATA AND SPECIFICATIONS

TECHNICAL DATA

COIL SPRING, SHOCK ABSORBER AND ANTI-ROLL BAR

Features	Model / Versions	Sport Wagon: 33 1.3 S	Sport Wagon: 33 1.7 ♣	Sport Wagon: 33 1.5 4x4 / 33 1.7 4x4	Sport Wagon: 33 1.8 TD
Coil Spring	Alfa Romeo part No.	131990		131805	133007
	Wire diameter mm (in)	11.8 (0.464)		11.2 (0.440)	11.2 (0.440)
	Coil diameter mm (in)	111 (4.37)			
	Free length mm (in)	313 (12.32)		302 (11.89)	323 (12.72)
	Stiffness N/mm (kg/mm) (lb/in)	23,5 (2,4) (134.4)			
Shock absorber	Type	SPICA			
		BOGE			
		HYDRAULIC			
	Piston rod diameter mm (in)	12 (1) (0.472) 11' (2) (0.433)			12 (1) (0.472)
	Stroke mm (in)	180 (1) (7.086) 144 (2) (5.67)			180 (1) (7.086)

(1) For SPICA shock absorbers only
(2) For BOGE shock absorbers only

INSPECTION AND ADJUSTMENT

DATA OF SHOCK ABSORBER SETTING

Features	Model / Versions	Sport Wagon					
		33 1.3 S	33 1.7 ie	33 1.5 4x4	33 1.7 4x4	33 1.3 S 33 1.7 ie 33 1.8 TD	33 1.8 TD
TYPE		SPICA	BOGE	SPICA	BOGE	BOGE	SPICA
Alfa **Romeo** part No.		549137	5491230	549142	549134	581052	549141
Low speed	Compression N (kg)	216±40 (22±4)	117,6±40 (12 ±4)	180±40 (18,4±4)	117,6±40 (12±4)	100±40 (10,2±4)	220±40 (22,4±4)
	Extension N (kg)	196±40 (20±4)	117,6±40 (12±4)	200±40 (20,4±4)	157±40 (16±4)	90±40 (9,2±4)	200±40 (20,4±4)
High speed	Compression N (kg)	520±40 (53±4)	461 ±49 (47±5)	520±40 (53-14)	451±50 (46±5)	400±50 (40,7±5)	520±40 (53±4)
	Extension N (kg)	760±40 (77,5±4)	853±83 (87±8,5)	1160±40 (118,3±40)	799±78 (81,5±8)	730±75 (74,4±7,6)	1160±40 (118,3±4)

NOTE: The shock absorbers are Integrated In the strut-tubes.

GROUP 28

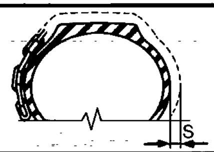
CONTENTS

(*) Refer to 'WORKSHOP MANUAL Alfa 33 VOLUME I and VOLUME II – Group 28

28

SERVICE DATA AND SPECIFICATIONS

TECHNICAL DATA

Dimension / Model			33✱✱ 33 1.3 33 1.3 S		33 1.5 TI		33 1.5 4x4		33 1.7✱		33 1.7 IE 33 1.7✱ ELECTRONIC INJECTION		33 1.8 TD	
TIRE	RIM	Unit of measurement	INFLATING PRESSURES (1)											
			a	P	a	P	a	P	a	P	a	P	a	P
165/70 R13 76S 165/70 R13 79T	5 1/2 J x 13"	kg/cm²	1,8	1,6	–	–	–	–	–	–	–	–	–	–
175/70 R 13 82T	5 /2 J x 3"	kg/cm²	–	–	1,8	1,6	1,8	1,8	–	–	–	–	2,2	1,8
185/60 R14 82H	5 1/2 J x 14"	kg/cm²	–	–	–	–	–	–	1,8	1,6	1,8	1,8	–	–
Balance (max. allowed residual balance)		g (oz)	8 (0.28)											
Balance weights		g (oz)	10 ÷ 40 (at 10 g intervals) - 0.35 ÷ 1.40 (at 0.35 oz intervals)											
Snow chains Chain "s" max. dimensions (for tires 165/70 SR 13)		mm (in)	16 (0.63)											

A = Front
P = Rear

S rating = Up to 180 km/h (112 m.p.h.)
T rating = Up to 190 km/h (118 m.p.h.)
H rating = Up to 210 km/h (130 m.p.h.)

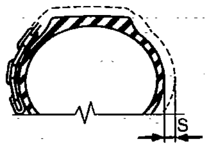
(1) Inflating pressure measured with cold tires.
In particularly heavy operating conditions (max. load, high temperatures, high speeds, etc...) it is advisable to increase inflating pressures by 0.2 kg/cm² (0.2 bar; 20 kPa; 2.84 p.s.i.).
In the event of rear axle overloading (trailer hauling. L.P.G. tank, etc...) it is advisable to increase rear tires inflating pressure by 0.6 kg/cm² (0.6 bar; 60 kPa; 8.53 p.s.i.)
Unit of measurement conversion:
2.2 kg/cm² = 2.16 bar = 216 kPa = 31.30 p.s.i.
1.8 kg/cm² = 1.76 bar = 176 kPa = 25.6 p.s.i.
1.6 kg/cm² = 1.57 bar = 157 kPa = 22.76 p.s.i.

GROUP 28

CONTENTS

(*) Refer to: "WORKSHOP MANUAL Alfa 33"
VOLUME I and VOLUME II - Group 28

28

Dimension		Model	Sport Wagon 33 1.3 S		Sport Wagon 33 1.7 ⊕ / 33 1.7 ⊕ Δ / 33 1.7 4x4 Δ		Sport Wagon 33 1.5 4x4		Sport Wagon 33 1.8 TD	
TYRES	RIM	Unit of measurement	INFLATING PRESSURE (1)							
			A	P	A	P	A	P	A	P
165/70 R1376S 165/70 R1379T	5 1/2 J x 13"	Kg/cm²	1.8	1.8		–	–		–	–
175/70 R13 82T	5 1/2 J x 13"	Kg/cm²	–	–	–	–	1.8	1.8	2.2	1.8
185/60 R14 82H	5 1/2 J x 14"	Kg/cm²	–		2.0	2.0	–	–	–	–
Balance (max. allowed residual balance)		g	8							
Balance weights		g	10 ÷ 40 (at 10 g intervals)							
Snow chains Chain "S" max. dimensions (for tyres 165/70 R13)		mm	16							

[(A) With eiectronic injection engine for countries where antipollution regulations are in-force.

A = Front
P = Rear

S rating = Up to 180 Km/h (112 m.p.h.)
T rating = Up to 190 Km/h (118 m.p.h.)
H rating = Up to 210 Km/h (130 m.p.h.)

---

(1) Inflatjng pressure measured with cold tyres.
In particularly heavy operating conditions (max. load, high temperatures, high speeds, etc...) it is advisable to increase inflating pressures by 0.2 kg/cm² (0.2 bar; 20 kPa; 2.84 p.s.i.).
In the event of rear axle overloading (trailer hauling. (L.P.G. tank, etc...) it is advisable to increase rear tyre inflating pressure by 0.6 kg/cm² (0.6 bar; 60 kPa; 8.53 p.s.i.).
Unit of measurement conversion:
2.2 kg/cm² = 2.16 bar = 216 kPa = 31.30 p.s.i.
1.8 kg/cm² = 1.76 bar = 176 kPa = 25.6 p.s.i.
1.6 kg/cm² = 1.57 bar = 157 kPa = 22.76 p.s.i.

GROUP 40

All information contained in this group is applicable to
1.7 electronic injection engiries with catalytic convertor only

CONTENTS

(*) Refer to "WORKSHOP MANUAL **Alfa 33**" VOLUME I 'AND VOLUME II - Group 40

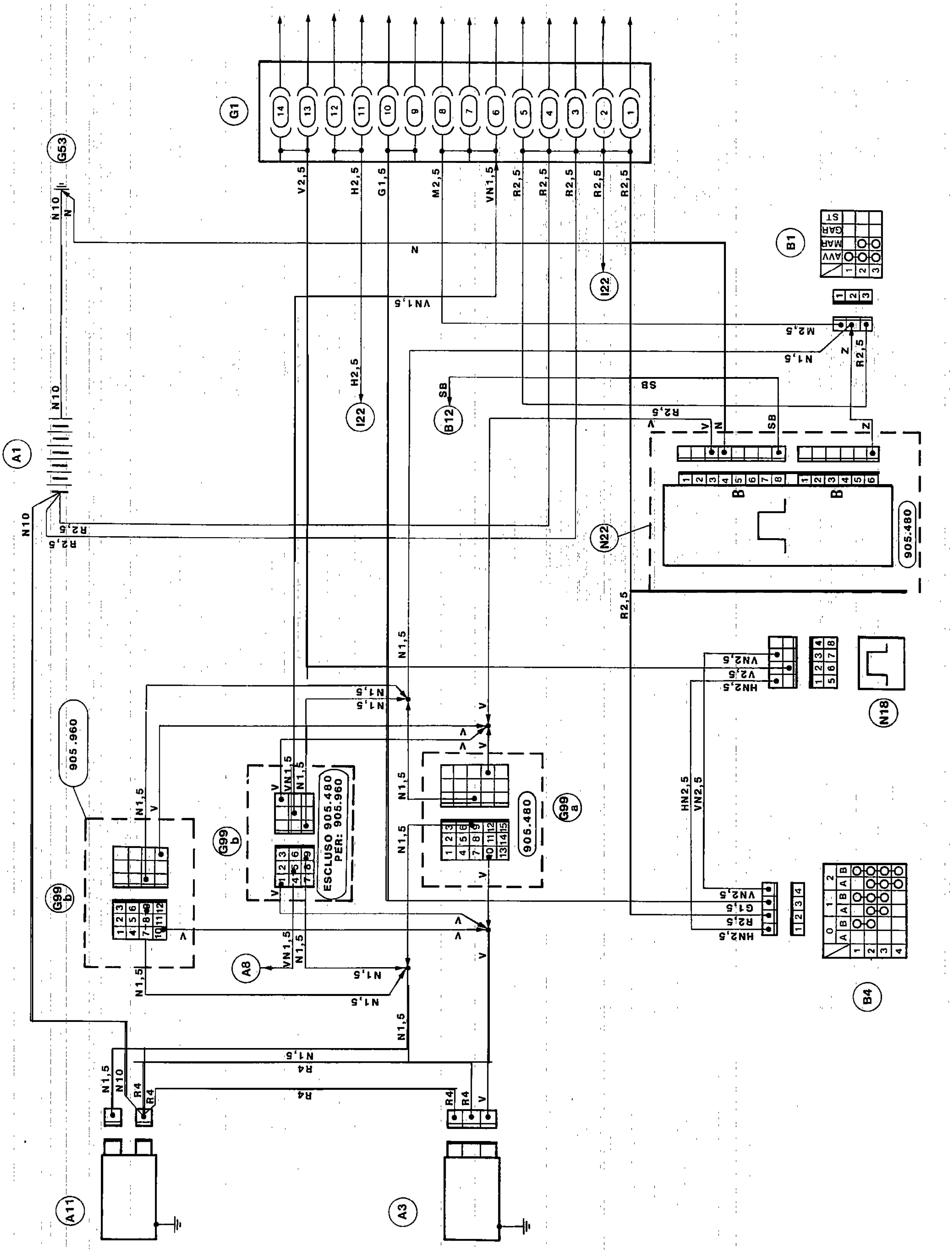
(•) Refer to "WORKSHOP MANUAL EC Models" - Group 40

POWER SUPPLY ROUTING

For 1.7 electronic injection engine. with catalytic donvertor only

POWER DISTRIBUTION WIRING DIAGRAM

(wiring diagram)

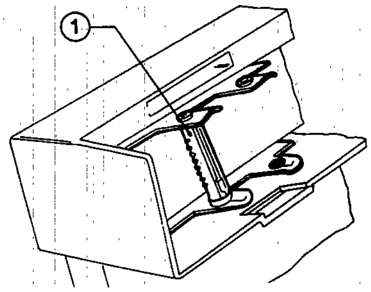


FUSES

LOCATION

The fusebox is an integral part of the terminal board support and is located on left side of the intermediate bulkhead, in the engine compartment.
Furthermore there are two fuses relating to Injection wiring in rightfront area of engine compartment close to relative lighting unit.

CHECK

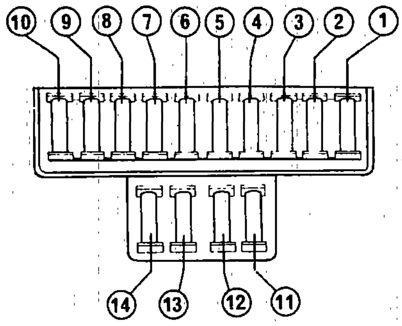


1 Fuse

CAUTION:

a. Should a fuse blow, before replacing it, make sure that the cause of failure has been removed.
b. Use fuses with the specified amperage only. Never use fuses with an amperage greater than that specified.
c. Correctly insert fuse into fusebox, aligning it carefully in its seating.
d. Should dar remain stationary for a long time, remove fuse protecting supply circuit of clock.

SERVICES PROTECTED BY FUSES



In the following table, for each model, it is specified which are the services protected by each fuse.

Fuse	Protected Service	Ampere	Models: 33 1.7 IE	Models: 33 1.7 injection
1	Front power windows Heedlight washer timer - Headlight washer electric pump (*)	16	X	
2	Door lock control unit Front fog lights	16	X	
3	Heated rear window	16	X	
4	Car radio Cigar lighter - Horns	16	– X	
5	Passenger compartment roof lamp-Intermittence of direction and hazard lights - Stop switch	8	X	
6	Windscreen wiper - Windscreen wiper electronic intermittence generator - Windscreen wiper control - Windscreen washer pump control - Cluster Windscreen washer electric pump	8	X	
7	Haated raar window switch - Heater switch - Rear window relay Power window relay - electronic injection relay — clock Rear window wash/wiper	8	X X –	X X X

(*) Only for Sweden version

Fuse	Protected Service	Ampere	Models 33 1.7 IE	33 1.7 ♦ Injection
8	Reverse switch - Hazard light switch lighting	8	X	X
	ALFA ROMEO Control		–	–
9	Sida light left front and right rear - RH. number plate light	8	X	X
	Drawer light		X	X
	ALFA ROMEO Control (Side light left front and right rear - R.H. number plate light)		X	–
	Cigar lighter		X	X
10	Side light: right front and left rear - L.H. number plate light	8	X	X
	ALFA ROMEO Control (Side light! right front and left rear - L.H. number plate light)		X	–
	Heater control lighting lamp - Cluster lighting lamp		X	X
	Front fog light relay - front fog light switch lighting		X	X
11	Right low beam	8	X	
12	Left low beam - Rear fog light, switch	8	X	
13	Right full beam	8	X	
14	Left full beam - Full beams warning lamp	8	X	
(**)	Lambda sensor resistance	7.5	X	
(**)	Fuel pump	1.5	X	

(*) Otily for Sweden version.

(**) These fuses are located on right front area of engine room close to optical groups.

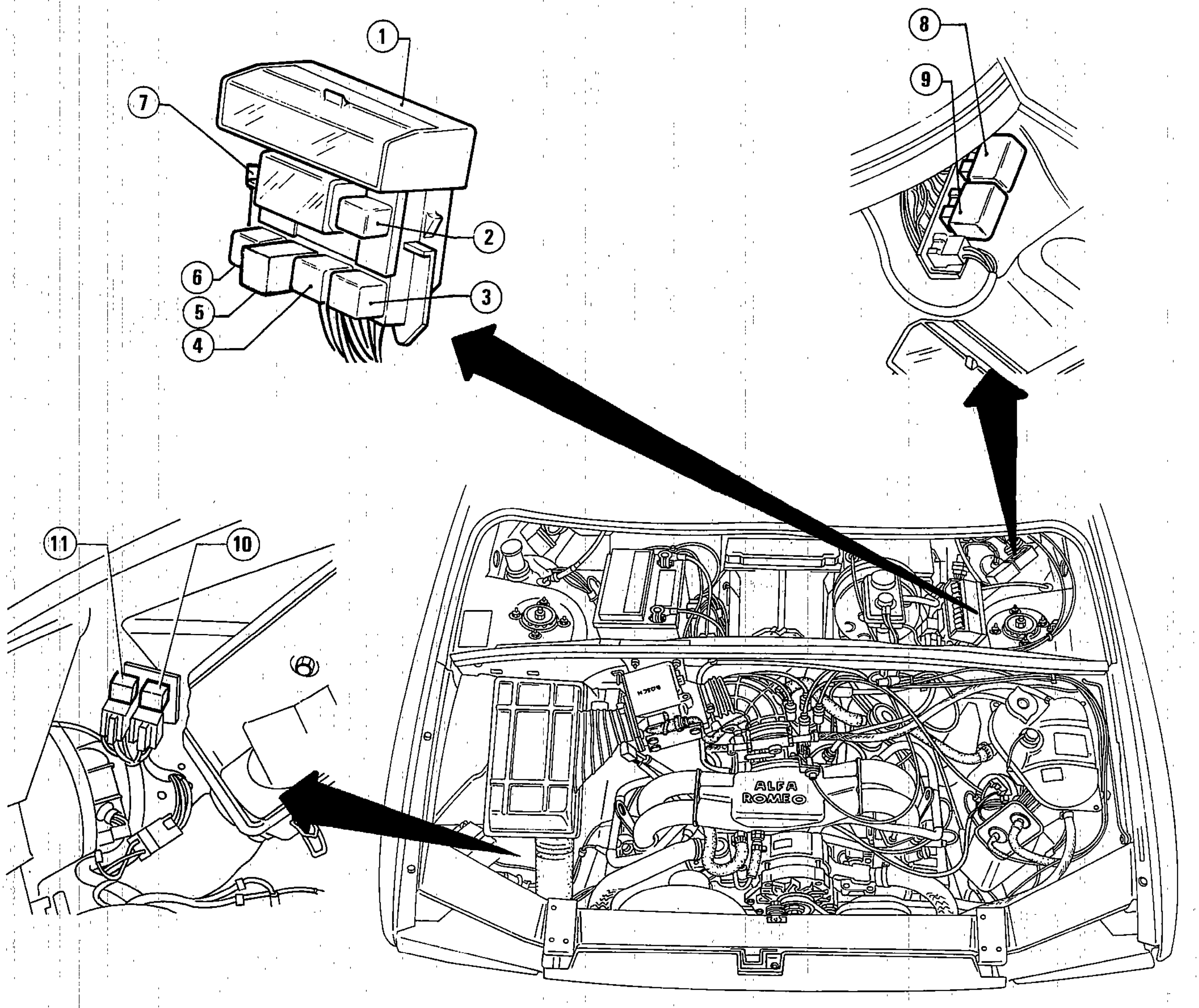
ELECTROMECHANICAL AND ELECTRONIC DEVICES

Only for 1.7 electronic injection engine with catalytic convertor

RELAYS, ELECTRONIC AND INTERMITTENCE DEVICES

LOCATION

To locate components, see following figures and the two tables "remote control switches and electronic devices and intermittences".

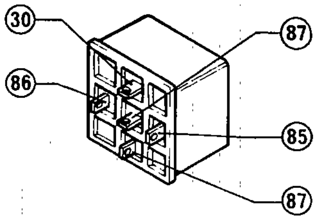
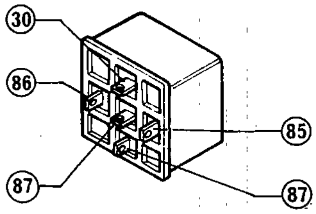
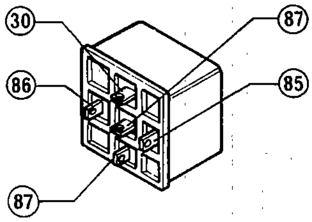
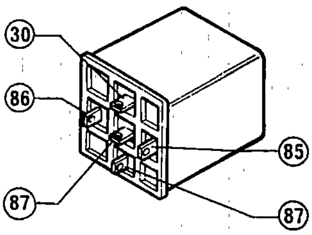
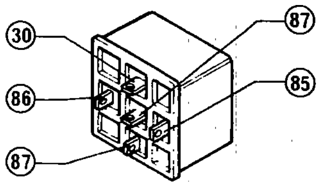
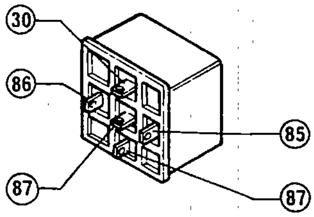


1 Fuseholder box
2 Beam excluding remote control switch
3 Horns remote control switch
4 Thermal window remote control switch
5 Lamp washing remote control switch
6 Front window lifting remote control switch
7 Foglamps remote control switch
8 Electronic window intermittence
9 Lamps and beam switching device
10 Main injection remote control switch
11 Fuel pump remote control switch

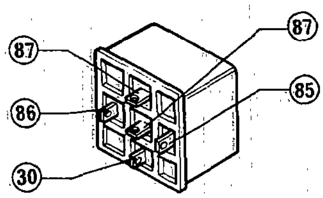
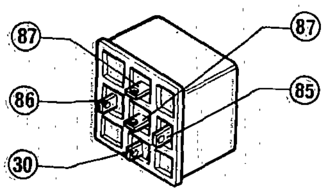
CHECK

All components must be of the type stated on the specification table

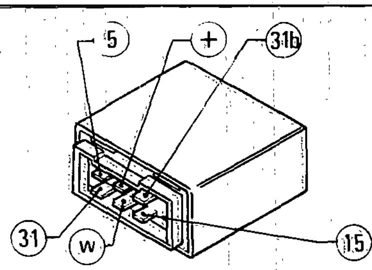
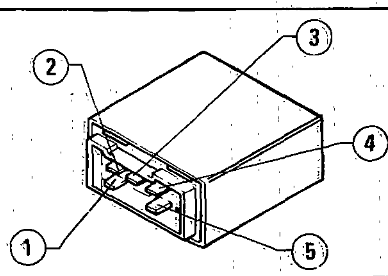
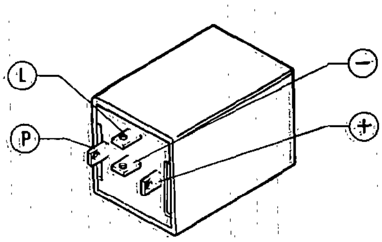
"Relays and Timer" Table

Component		External view	Symbols	Position (See fig. pag. 40-5)
Full beam cut-out relay	I21		30 86 87 85 87 7	2
Horns relay	I3		30 86 87 85 87	3
Heated rear window relay	1 2		3 0 86 87 85 87	4
Headlight washer relay	I19		30 86 87 85 87	5
Power window relay	I12		30 86 87 85 87	6
Front foglamp relay	I17		30 86 87 85 87	7

"Relays and Timer" (Table continued)

Component		External view	Symbols	Position (See fig. pag. 40-5)
Main injection relay	S12b		87 86 87 85 30	10
Fuel pump relay	S12a		87 86 87 85 30	11

"Intermittences and electronic devices" Table

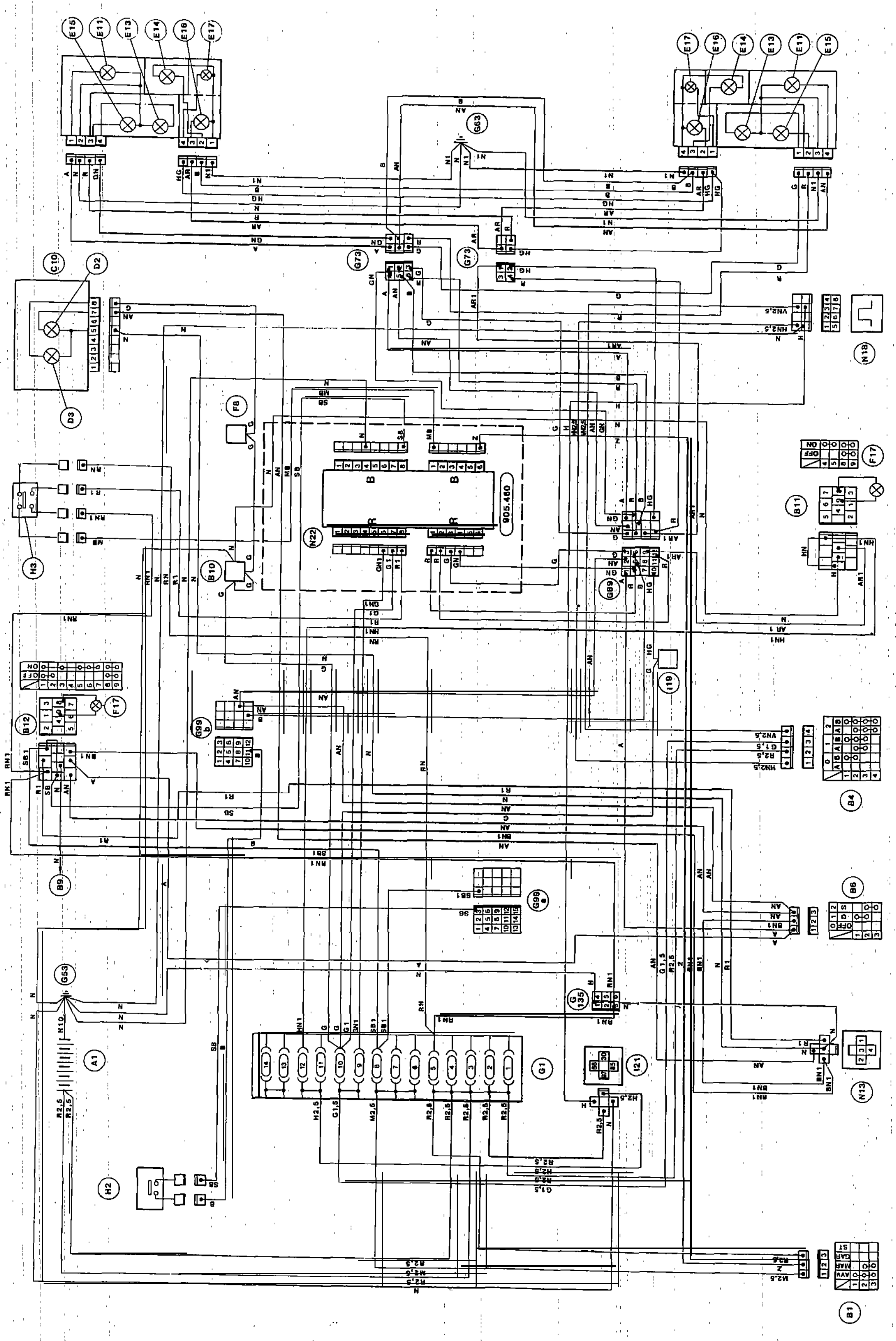
Component		External riew	Symbols	Position (See fig. pag. 40-5)
Windscreen wiper electronic intermittence	N14		5 + 31b 31 W 15	1
Electronic device for headlights and flashing changeover	N18		2 3 4 1 5	2
Hazard and direction light intermittence	N13		L P − +	(*)

(*) Located in compartment, under the dashboard, at the right of steering column, as per **Alfa 33**.

LIGHTING SYSTEM

For 1.7 electronic injection engines with catalytic convertor only

EXTERNAL REAR LIGHTING *(wiring diagram)*

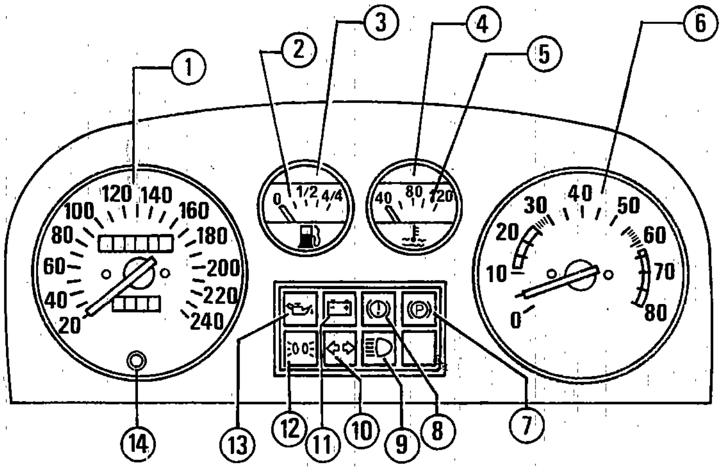


PANEL INSTRUMENTS, SENSORS AND SENDERS

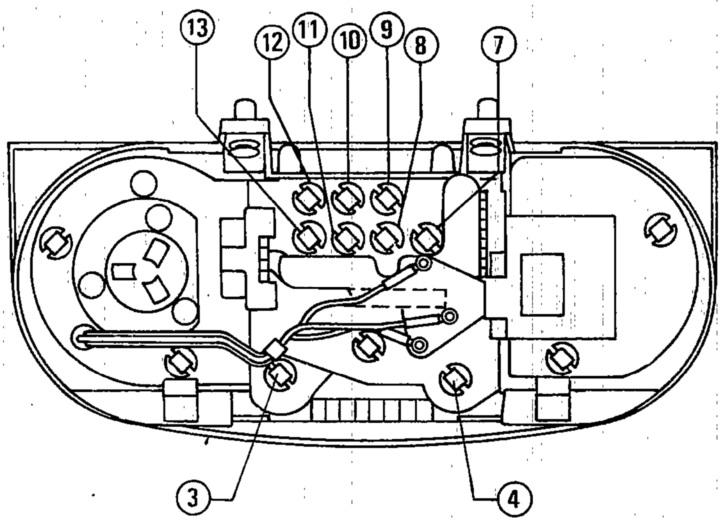
For 1.7 electronic injection engine. with catalytic convertor only

CLUSTER

Front view

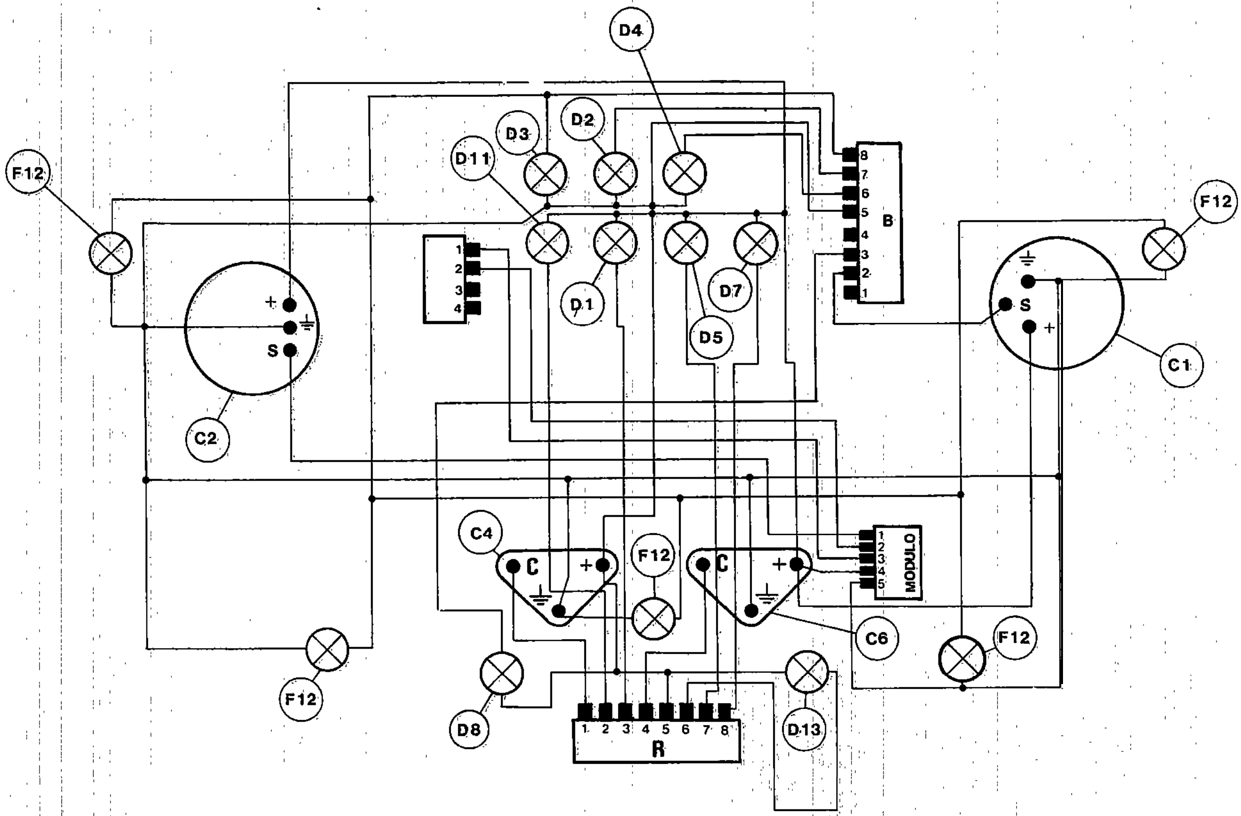


Rear view



1 Tachometer - odometer
2 Fuel level gauge
3 Fuel reserve warning lamp
4 Max coolant temperature warning lamp
5 Coolant temperature gauge
6 Rev. counter
7 Hand brake warning lamp
8 Brake fluid insufficient level warning lamp
9 Headlight warning lamp
10 Direction light warning lamp
11 Alternator charge warning lamp
12 Lights warning lamp
13 Insufficient oil pressure warning lamp
14 Trip'odometer reset knob

WIRING DIAGRAM



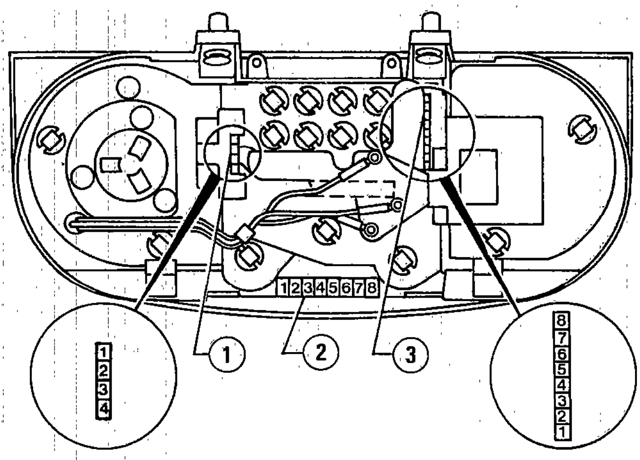
CI Electronic rev. counter
C2 Electronic tachometer
C4 Fuel. level gauge
C6 Coolant temperature- gauge
DI Alternator- charge: warning: lamp
D2 Direction, light warning. lamp
D3 Side light warning: lamp
D4 Full beam warning: lamp
D5 Brake fluid level warning lamp
D7 Hand brake warning lamp
D8 Fuel reserve warning lamp
D11 Engine oil min.; pressure warning lamp
D13 Engine coolanti max. temperature warning lamp
F12 Cluster lighting lamp
G5 Connector
G6 Cluster B connector
G7 Cluster R connector

PIN-OUT LOCATION

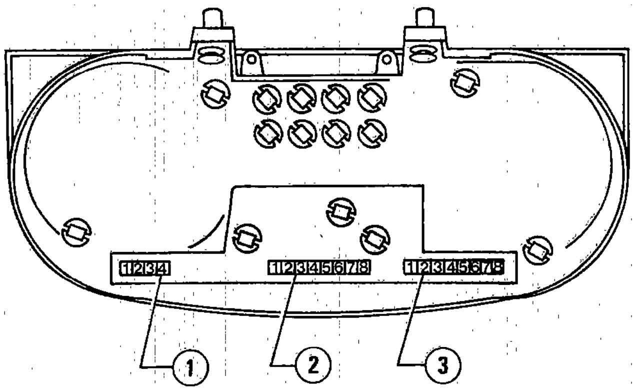
For location of pin-outs of connectors 1, 2 and 3, refer to the following figures and tables.

Cluster rear view

Borletti type



Jaeger type



Connector 1 : white (Borletti)

Pin'	Colour	Service,
1	B + braid	Connector for tachimetric pulse generator
2	B	Connector for tachimetric pulse generator
3	—	Available
4	—	Available

Connector 3 : white

Pin	Colour	Service
1	—	Available
2	B	Engine wiring connector
3	ZN	Ihtermecliate wiring connector
4	—	Available
5	N	Direction indicator intermittence
6	VN	Fuseholder box to fuse 14 (full beam warning lamp)
7	A N	Direction indicator intermittence
8	G	Illumination of heater fan swltch

Connector 1 : white (Jaeger)

Pin	Colour	Service
1	Z	Intermediate wiring connector
2	H	Engine wiring connector
3	V	Engihe wiring connector
4	M	Engine wirihg cbnnector
5	SN	Combination switch unit, windscreen wash/wipe pump
6	C N	Engine wiring connector
7	C	Min. brake fluid level sensor and ALFA~ ROMEO Control warning lamp
8	HN	Power window wiring' connector

REMOVE AND INSTALLATION

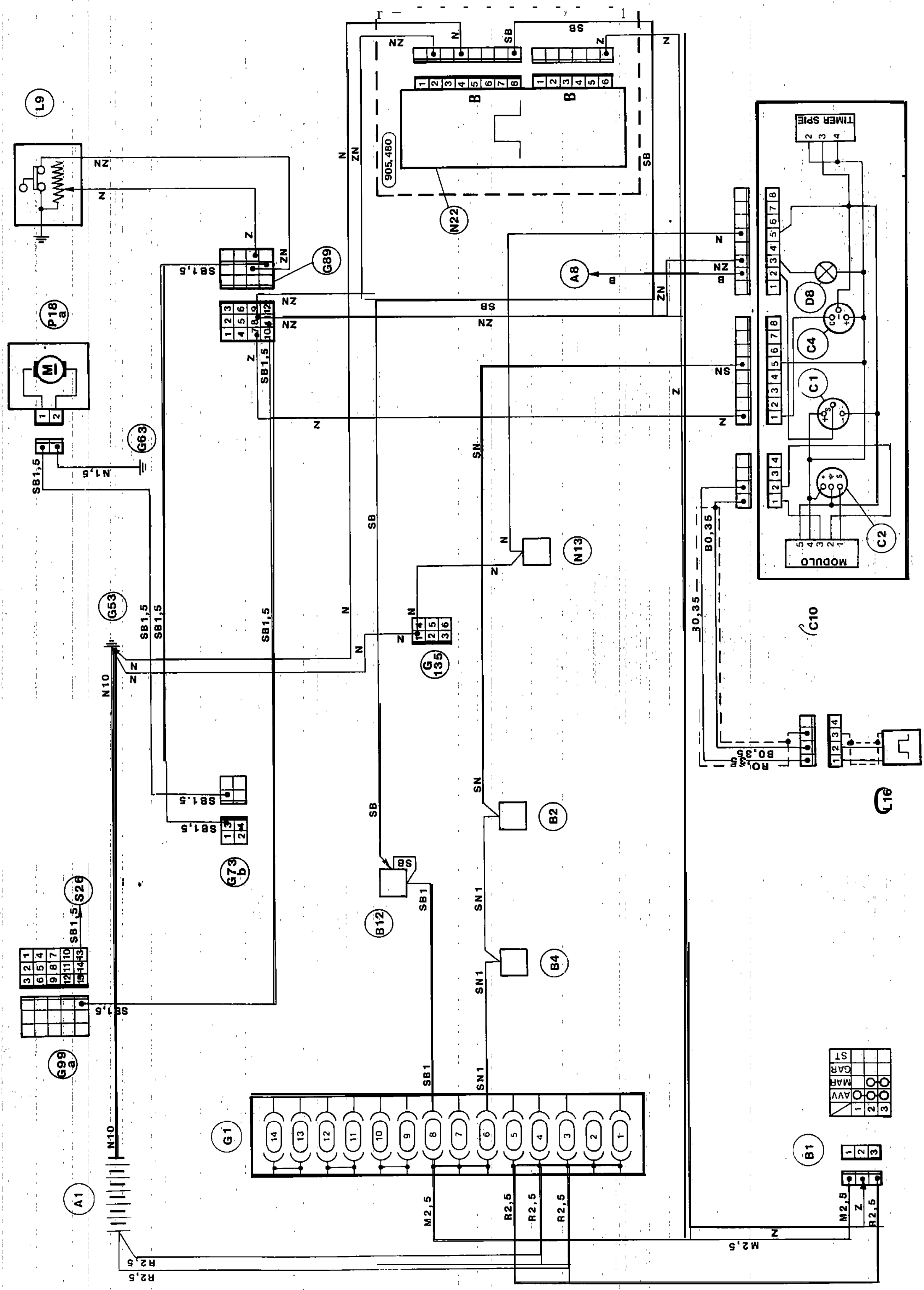
As per models 33.

REMOVE AND INSTALLATION

As per models 33.

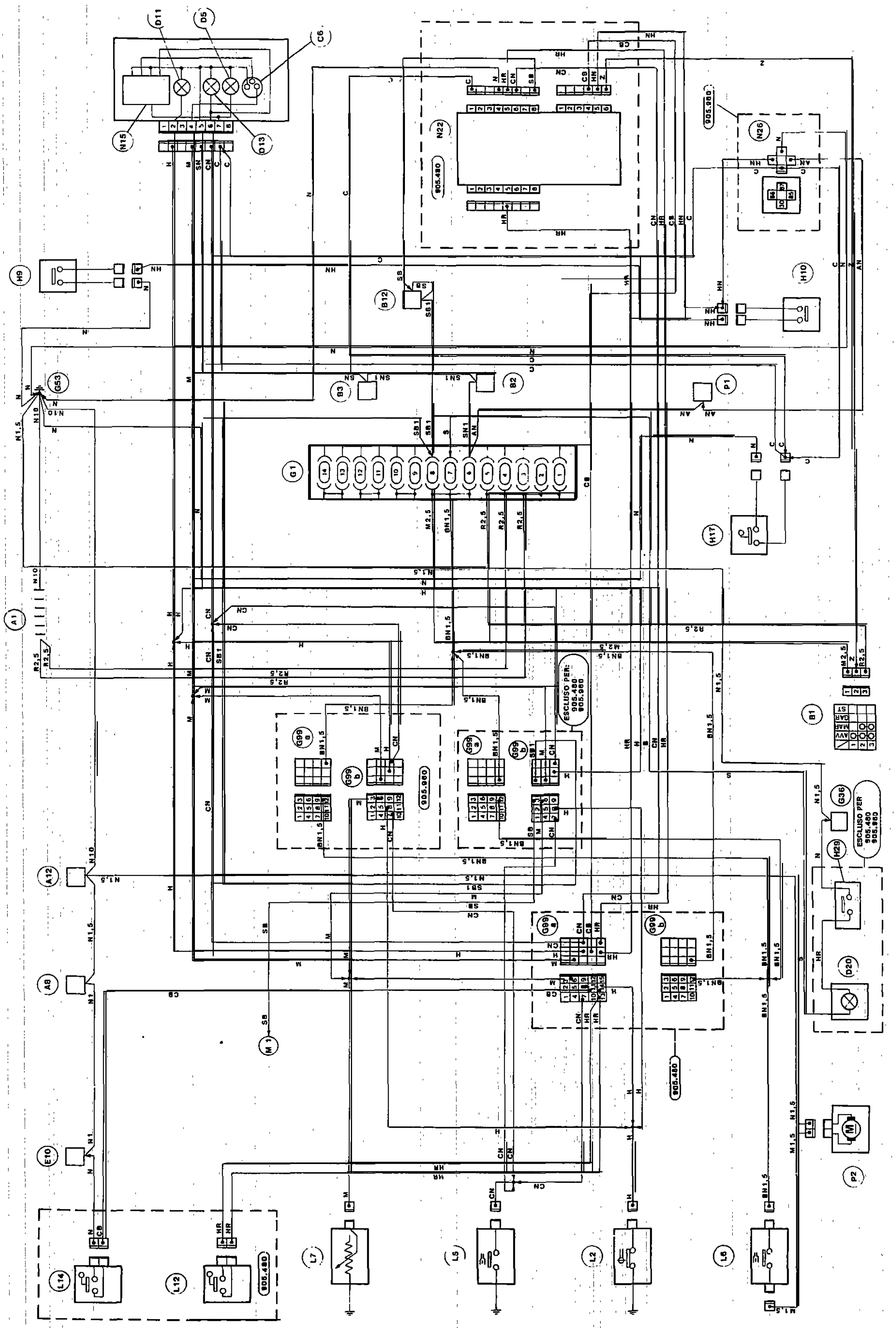
FUEL SUPPLY AND REV. COUNTER PULSE GENERATOR

(wiring diagram)



ENGINE COOLING, LUBRICATION, BRAKE PAD WEAR SENSOR, BRAKE-CLUTCH FLUID MIN. LEVEL SENSOR *(wiring diagram)*

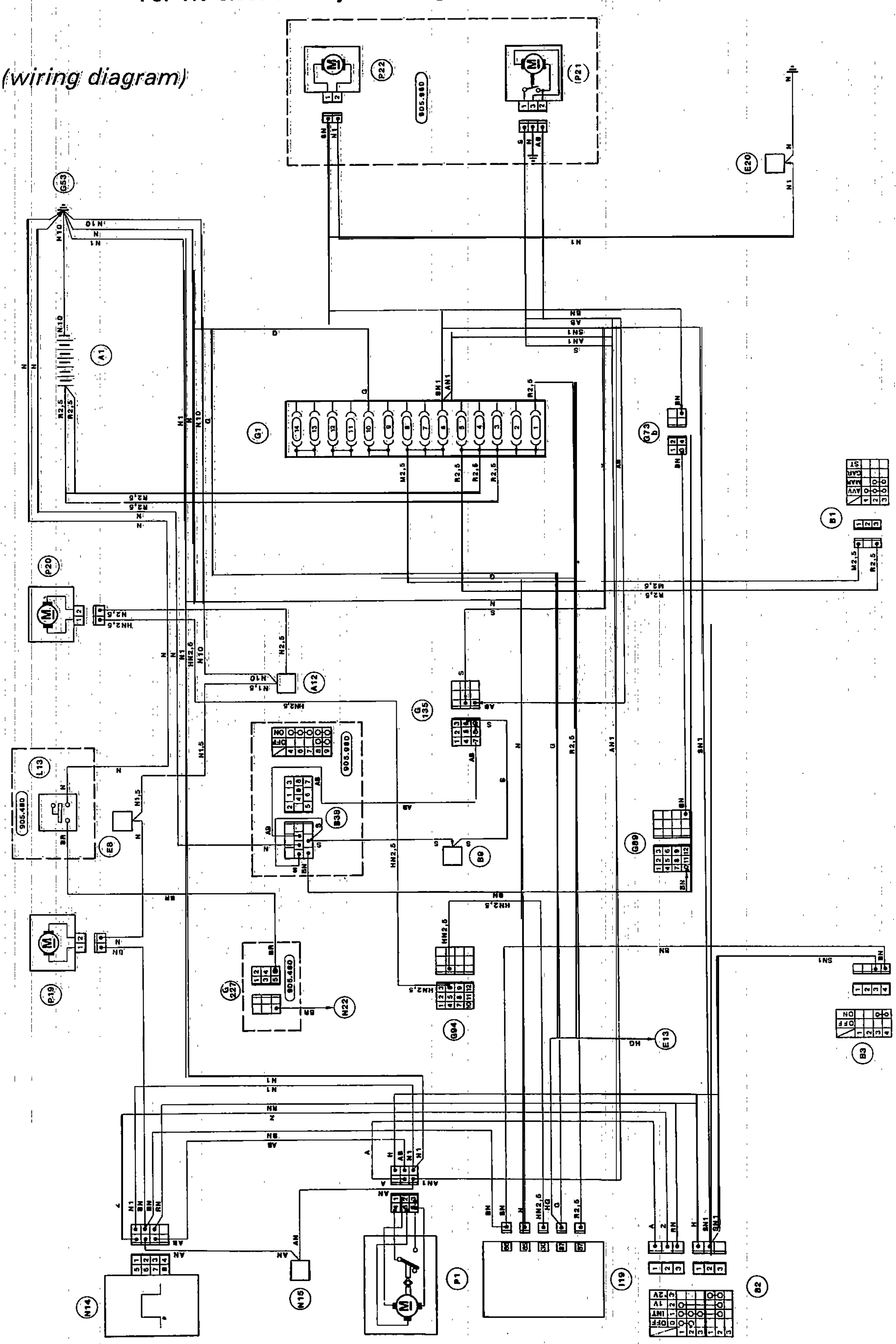
For 1.7 electronic injection engine with catalytic convertor only



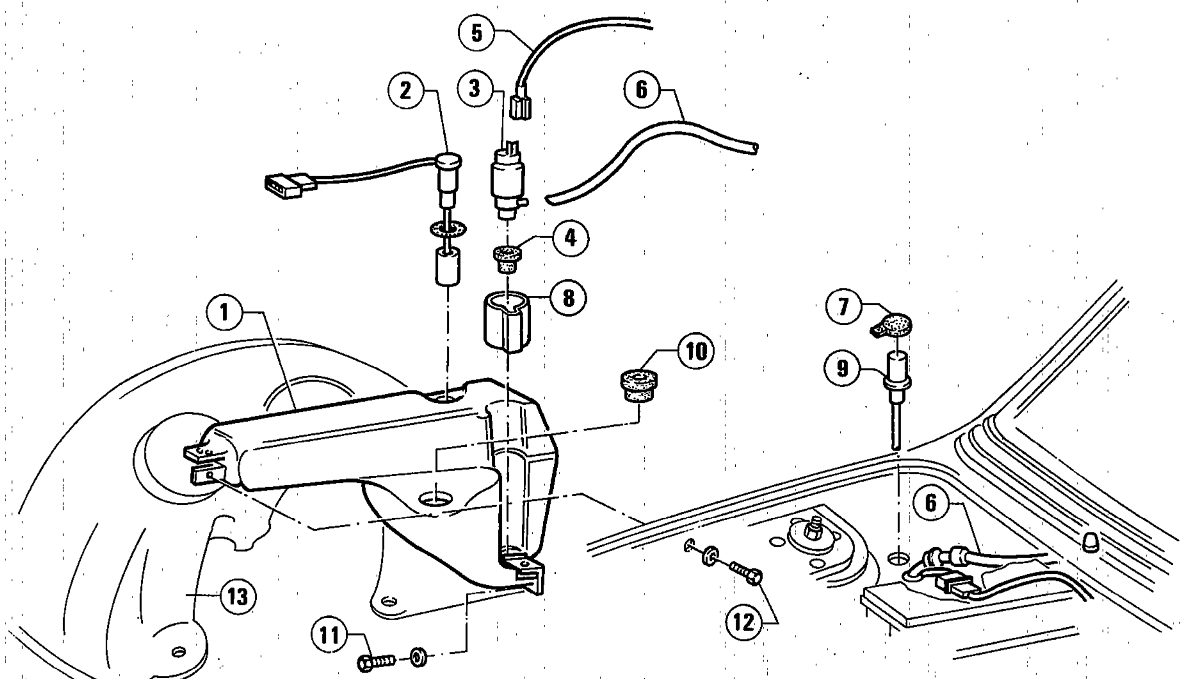
WINDSCREEN WASH/WIPER, HEADLIGHT WASHER AND REAR WINDOW WASH/WIPER

For 1.7 electronic injection engine with catalytic convertor only

(wiring diagram)



WINPSCREEN WASHER



1 Tank
2 Liquid level sensor
3 Windscreen washer pump
4 Gasket
5 Pump wiring
6 Delivery tube to sprayers
7 Plug
8 Pump covering
9 Filler inlet
10 Gaskel
11 Lower fixing screw
12 Upper fixing screw
13 Gravel guard of right front wheel

TANK

REMOVAL AND INSTALLATION

With reference to the figure, operate as follows:

1. Remove front right wheel and its relevant gravel guard ⑬.
2. Disconnect right side direction indicator.
3. Operating from engine compartment, remove press fit filler inletfitting ⑨.
4. Unscrew upper fixing screw ⑫.
5. Operating from under wheel arch, unscrew screw ⑪ and lower tank ①.
6. Disconnect level sensor ② wiring and wiring ⑤ from pump ③.
7. Disconnect tube ⑥ from pump, remove tank and drain liquid.
8. If necessary, remove pump ③ complete with gasket ④ and sensor ② with associated gasket from tank ①.
9. 'For ta& installation, reverse order of removal.

PUMP

REMOVAL AND INSTALLATION

1. Remove tank.
2. With reference to figure, remove covering ⑧ and pump ③ press fitted into its relevant gasket ④
3. For pump installation, reverse order of removal.

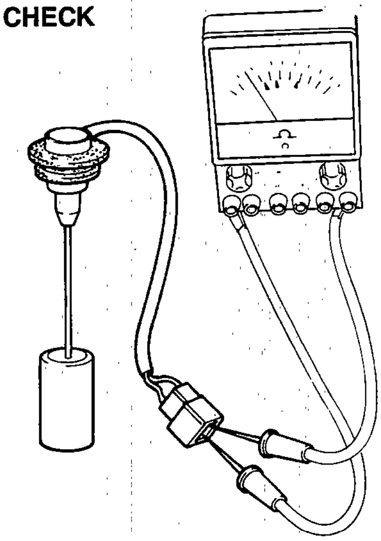
WINDSCREEN WASHER LIQUID LEVEL SENSOR

REMOVAL AND INSTALLATION

As per figure, operate as follows:

1. Disconnect tank ① and lower it, as stated at "tank" up to step ⑤.
2. Disconnect sensor ② wiring and remove it from tank.
3. Proceed to installation, operating in reverse order to re'moval.

CHECK



1. Connect the two ends of tester to sensor connector by operating as per figure.
2. Check sensor proper functioning by verifying the following.

Float liftes: ∞
FLoat lowered: 0 Ω

KEY TO WIRING DIAGRAM

A : STARTING- CHARGING

A I Battery
A2 Alternator
A3 Alternator with integral electronic voltage regulator
A4 Voltage regulator
A5 Ignition distributor
A5a Ighition distributor A
A5b Ign'ition distributor B
A6 Pulse generator
A 7 Rotor
A8 Ignition coil
A8a Ignition coil A
A8b 'Ignition coil B
A9 Coil resistor
A10 2-way connector for coil
Al 1 Starter motor
A I2 Spark plugs
A I3 Pre-heating glow plugs
A I4 Alternator cable terminal board

B: MANUAL ELECTRIC CONTROLS

B1 Ignition switch
B2 Windscreen wiper control switch
B3 Windshield washer and/or headlamp wash/wiper pump control switch
B4 Control switch for side lights. flashing, low/full beam headlamps
B5 Horn control switch
B6 Direction indicator control switch
B7 Low beam flashing control switch
B8 Full beam flashing control switch'
B9 Heated rear window control switch
B10 Fog lamp control switch
B Ii Rear fog lamp control switch
B12 Road hazard lights control switch
B13 Passenger compartment front roof lamp control switch
B14 Passenger compartment rear roof lamp control switch
B15 Passenger compartment roof lamp control switch
Blé Cluster lighting dimmer rheostat
B17 Gearbox oil level warning lamp switch
B18 Door lock control switch on front right door
B19 Door lock control switch on front left door
B20 Interior door locking switch
B21 Front right power window control switch
B22 Front left power window control switch
B23 Rear right powar windbw control switch
B24 Rear left power window control switch
B25 Rear power window inhibitor switch
B26 Rear power window and rear cigar lighter inhibitor swifch
B27 Front seat height control switch
B28 Front left backrest control switch
B29 Front right backrest control switch
B30 Door mirror control switch
B31 Antenna control switch
B32 Windshield washer pump control
B33 Front spot light switch
B34 Rear left spot light switch
B35 Rear right spot light switch
B36 Door mirror double control switch
637 , Parking light control switch
B38 Rear window wiper control switch
B39 Trip odometer recall microswitch
B40 Trip odometer reset microswitch
B41 VF electronic rheostat
B42 Lamp dimmer rheostat
B43 Internal control switch for door unlock
B44 Rear spot light control switch
B45 Identification light control switch
B46 Two note horns - normal horns control switch
B47 Sun roof motor control switch
B48 Intercom system control switch
B49 Speak/listen changeover switch
B50 Siren control switch
B51 Driver:s seat heater control switch

c: INSTRUMENTS

C1 Electronic rev counter
c2 Electronic speedometer
c3 Voltmeter
c4 Fuel level gauge
c5 Oil pressure gauge
C6 Coolant temperature gauge
c7 Clock
C8 Space free for instrument
C9 Turbocharger air pressure gauge
CIO Cluster (*)
Cl 1 ALFA ROMEO Control display
C12 Performance gauge display
C13 Optoelectronic cluster
C14 Warning lamp panel
(*) CIO AIBICIDIEIF Cluster connectors

D: WARNING LAMPS

DI Alternator charge warning lamp
D2 Direction, indicator warning lamp
D3 Side light warning lamp
D4 Full beam warning lamp
D5 Brake fluid low level warning lamp
D6 Heater/ventilation warning lamp
D7 Handbrake warning lamp
D8 Fuel reserve warning lamp
D9 Choke warning lamp
D10 Handbrake ON - brake fluid level warning lamp
DI 1 Engine oil minimum pressure warning lamp
D12 Pre-heating glow plug waining lamp
D13 Engine coolant high temperature warning lamp
D14 Maximum air pressure warning lamp
D15 Minimum fuel pressure warning lamp
D16 Free warning lamp
D17 Gear 'position warning lamp
D18 Manual injection advance warning lamp
D19 Brake pad wear warning lamp
D20 Rear drive engagement warning lamp
D21 ALFA ROMEO Control warning lamp
D22 Heated rear window warning lamp
D23 Hazard light warning lamp
D24 Rear fog light warning lamp
D25 Fog light warning lamp
D26 Injection diagnosis warning lamp
D27 A.B.S. system warning lamp
D28 Identification light warning lamp
D29 Ignition diagnosis warning lamp (antiknocking)

E: EXTERNAL LIGHTS

E I Front direction indicator

E: EXTERNAL LIGHTS (continued)

E2 Front side light
E3 Front direction indicator and side light
E4 Front side marker light
E5 Low beam light
E6 Low beam light with incorporated side light
E7 Full beam light
E8 Low and full beam light
E9 Side repeater
E10 Fog light
E11 Rear direction indicator
E12 Rear side marker light
E13 Rear parking light
E14 Reversing light
E15 Stop light
E16 Rear fog lamp
E17 Numberplate light
E18 Stop and rear side light
E19 Rear right light
E20 Rear left light
E21 Inspection light
E22 Identification light

F: INTERIOR LIGHTS

F1 Passenger compartment front roof lamp
F2 Passenger compartment rear roof lamp
F3 Passenger compartment roof lamp
F4 Engine compartment lamp
F5 Luggage compartment lamp
F6 Door open signalling light
F7 Fuse light
F8 Heater/ventilation control lighting lamp
F9 Glovebox light
F10 Ashtray light
F11 Map light
F12 Cluster light
F13 Front spot light
F14 Rear right spot light
F15 Rear left spot light
F16 Ignition switch light
F17 Switch illumination light
F18 Rear spot light
F19 Passenger compartment roof lamp - right side
F20 Passenger compartment roof lamp - left side
F21 Reading spot light with switch - right side
F22 Reading light with switch - left side
F23 Floor lighting lamp on right internal valance panel
F24 Floor lighting lamp on left internal valance panel
F25 Vanity mirror roof lighting on sun visor
F26 Gearbox lever panel lighting lamp

G: FUSEBOX - CONNECTORS - GROUNDS

G1 Fusebox
G2 Auxiliary fusebox
G3 Fusebox terminal
G4 Frke fusebox
G5 Multiple connector
G6 Multiple connector 6 - cluster
G7 Multiple connector R - cluster
G8 Single connector
G9 Coinnector between, front left door wiring and door mirror switch
G10 Connector between front right door wiring and door mirror Switch
G11 Connector between board wiring and rear wiring
G12 Connector between board wiring and courtesy mirror switch
G13 Connector between board wiring and console wiring
G14 3-way connector between board wiring and door wiring
G15 2-way connector between board wiring and door wiring
G16 6-way connector between board wiring and door wiring
G17 Connector between board wiring and front right door wiring
G18 Connector between board wiring and front left door wiring
G19 Connector between board wiring and pessenger compartment roof lamp
G20 Connector for front right door - locking motor
G21 Connector for front right door wiring
G22 Connector for front left door - locking motor
G23 Connector for front left door wiring
G24 Connector for rear right door - locking motor
G25 Connector for rear right door wiring
G26 Connector for rear left door - locking motor
G27 Connector for rear left door wiring
G28 Connector between front right door wiring and power window switch
G28a Connector between rear right door wiring and power window switch
G29 Connector between' door lock wiring and rear power windows
G30 Connector for power windows and door lock
G31 Connector between front left door wiring and power window switch
G31a Connector between rear left door wiring and power window switch
G32 Connector between console wiring and rear right door wiring
G33 Connector between console wiring and rear left door wiring
G34 Connector for power window supply cable
G35 Connector between rear wiring and rear right tail light wiring,
G36 Connector for power window switch cables
G37 Connector for' combination switch on steering column
G38 Connector for air conditioner wiring
G39 Connector for clock
G40 Connector for door lock control unit
G41 Connector for tachymetric switch - rev counter pulse generator
G42 Connector between alternator and min engine oil pressure switch
G43 Connector for heater/ventilation control cables
G44 Connector for rear fog lamp
G45 Connector for headlight wash/wipe cables
G46 Connector for headlights
G47 Connector for right side - repeater cables
G48 Connector between electric door mirror and left side repeater cables
G49 Connector available
G50 Provision for loud speaker cables
G51 Provision for car radio cables
G52 Fusebox ground
G53 Engine compartment ground
G53a Engine compartment ground - right side
G53b Engine compartment ground - left side
G54 Passenger compartment ground
G54a Passenger'compartment ground - right side
G54b Passenger compartment ground - left side
G55 Valance panel ground
G56 Branch terminal board
G57 Provision for fuel tut-off solenoid valve
G58 Connector for cigar lighter
G59 Connector for electric door mirror
G60 Injection wiring ground
G61 Connector for ignition coil
G62 Clutch switch connector

G: FUSEBOX - CONNECTORS - GROUNDS (continued)

G63 Rear ground
G63a Rear right ground
G63b Rear left ground
G64 Connector for Trip Computer - clock
G65 Coaxial cable
G66 Motronic wiring ground
G67 Motronic connector
G68 Connector A with board wiring
G69 Connector B with board wiring
G70 Connector C with board wiring
G71 Connector for warning lamp on instruments
G72 Connector for seat back adjustment wiring
G73 Connector for rear services
G73a Con'nector for right reer services
G73b Connector for left rear services
G74 Connectors between Televel rear wiring and ALFA ROMEO Control
G75 Connector between right and left roof panel services
G76 Connector for roof panel services - right sida
G77 Connector for roof panel services'- left side
G78 Connector for front door services wiring
G79 Connector for rear door services wiring
G80 Connector for board wiring
G81 Con'nector for front left seat back adjustment
G82 Connector for front right seat back adjustment
G83 Rear connector for fast idle device
G84 Console cable connector
G84a Console cable connector (15 way)
G84b Console cable connector (12-way)
G85 Front service connector
G86 Connector for passenger compartment roof lamp
G87 Connector for rear door - locking motors
G88 Connector for rear tail lights
G89 Intermediate connector A
G90 Intermediate connector B
G91 Rear door sensor ground
G92 Luggage compartment ground
G93 Windshield frame upper cross member ground
G94 Engine compartment connector
G94a 10-way connector for engine compartment
G94b 8-way connector for engine compartment
G94c Engine compartment connector - right side
G94d Engine compartment connector - left side
G95 Central fusebox
G95A Connector for switches
G95B Connector for swirches
G95C Connector for cluster warning lamps
G95D Connector for ALFA ROMEO Control
G95E Connector for console
G95F Connector for fog light - rear fog light
G95G Connector for combination switch
G95H Connector for LH 'interface
G95I Connector for RH interface
G95L Conhector for clock . rheostats
G95M Connector for sun - roof
G95N Connector for battery
G95O Connector for ignition switch
G95P Connector for door services
G95Q Connector for performance gauge
G95R Connector for heated rear window
G95S Connector for cluster
G95V Fuses
G96 Single connector for ALFA ROMEO Control - cluster
G97 Connector for left doors services
G98 Connector for right doors services
G99a Conoector for engine dashboard (A)
G99b Connector for engine dashboard (B)
G99c Connector for engine dashboard (C)
G99d Connector for engine dashboard (D)
G99e Connector for engine dashboard (E)
GI 00 Connector for console - doors wiring
G101 Trip Computer connector
G102 Optoelectronic cluster connector
G103 Connector for ground. and brake fluid tank
G104 Connector for roof panel left pillar
G105 Connector for ashtray lamp
G106 Seat grounds
G107 Connector for fuel pump
G108 CEM wiring ground
G109 Injection, wiring ground
G1 10 Thermostat 'housing ground
GI 11 Connector for deshboard instrument wiring
GI 12a Connector A for roof wiring
G112b Connector B for roof wiring
G112c Connector C for roof wiring
G112d Connector D for roof wiring
GI 13 Connector for front left-hand fender
G114 Connector for outside temperature sensor
GI 15 Connector for tow bar vehicle socket
G116 Connector for tow bar trailer plug
GI 17 Connector for engine compartment lamp
GI 18 Connector for luggage compartment lamp
GI 19 Connector for vanity mirror roof lamp
GI 20 Connector for map reading lamp
G121 Connector for vehicle wiring
GI 22 Connector for ignition wiring
G123 Pedal assembly ground
G124 Connector for A.B.S. system
G125 A.B.S. system free fuse holder
GI 26 Fuse protecting A.B.S. system relays
G127 Free fuse holder for identification lights
G128 Free fuse holder for transceiver
G129 Connector fpr two-note horns - normal horns in engine compartment left side
G130 Switches connector
G I 31 Ground on upper cover
GI 32 Ground on manifold
G133a Electronic injection - ignition wiring connector A
G133b Electronic injection - ignition wiring connector B
G134 Left front pillar connector
G135 Rear window shelf wiring connector
G136 Front side marker intermediate connector
G137 Injection'supply wiring connector
G138 Headlights - combination switch connector
G139 Intercom system control unit connector
G140 Petrol pump attachment to floor services intermediate connector
G141 Intermediata connector for iear sidemarker
G142 Engine services connector
G143 Central bulkhead ground
G144 Backdoor wiring connector
G227 Mudguaid under panel service connector

H: SWITCHES

H1 Handbrake switch
H2 Reversing light switch
H3 Stop light switch
H4 Passenger compartment roof lamp switch on pillar
H5 Left front door open indicator switdh
H6 Right front door open indicator switch
H7 Left rear door open indicator switch
H8 Right rear door open indicator switch
H9 Right front brake pad switch
H10 Left front brake pad switch
H11 Right rear brake pad switch
H12 Left rear brake pad switch
H13 Choke switch
H14 Injection advance switch
H15 Gearbox oil low level switch (magnetic bulb)
H16 Starting and back-up inhibitor switch

H: SWITCHES (continued)

Hi 7 Brake fluid minimum level check switch
Hi8 Fast-idle switch in gearbox
H19 Low fuel pressure switch
H20 Inertia switch
H21 Clutch pedal fast idle switch
H22 Ignition microswitch
H23 Engine compartment lamp switch
H24 Luggage compartment lamp switch
H25 Glovebox light switch
Hi6 Contact swithh on rear door for rear window wiper
H27 Contact switch on rear door for heated rear window
H28 Carburettor contact/switch
H29 Switch for rear drive engagement warning lamp
H30 R.p.m.-activated microswitch
H31 Switch for idle r p.m. adjusting screw on carburettor
H32 Microswitch on carb'urettor for inserting timing variator
H33 Numberplate lights contact switch
H34 A.B.S. system brake fluid tank switch
H35 Fuel pre-heating filter thermal switch
H36 Diesel fuel post-heating microswitch

I: RELAYS

II' Engine cooling fan relay
I2 Heated rear window relay
I3 Horn relay
I4 Headlamp wiper relay
I5 Auxiliary relay for headlight wiper timer
I6 Fast idle relay
I7 Fuel pipe closing relay
I8 Relay excluding retarded rotor arm
I9 Glowplug relay
I10 Sta~rter inhibitor relay
I11 Front power window and seat raising relay
I12 Front powar window relay
I13 Rear power window relay
I14 Brake fluid automatic warning lamp control relay
I15 Low fuel pressure warning light relay
11'6 Headlight relay
117 Fog light relay
I18 Double contact relay
I19 Headlight washer pump relay
120 Beam changeover relay
I21 Full beam exclusion relay
122 Low beam exclusion relay
I23 Supplementary engine cooling fan relay
I24 Direction and hazard lights relay
I25 Rear fog light relay
I26 Roof lamp relay
I27 Seat height adjustment relay
I28 Hazard light relay
129 Fuel pump relay
130 Relay with CEM diode
131 Front power windows/heater relay
I32 Advance variation control unit relay
133 Carburetor microswitch relay
134 Rear fog light exclusion relay
135 Key operated supply relay
136 Relay for brake wear and liquid level
137 Relay for A.B.S. system control unit
138 Auxiliary A.B.S. system relay
139 Brake fluid level warning lamp relay
140 A.B.S. system brake fluid pump relay
141 Two note horns - normal horns relay
142 Two note horns relay
143 Inspection lamp relay
144 Fu~el pre heating device relay
145 External rearview mirrors defrosting relay
146 Siren relay
147 Oil radiator electric fan relay

L: SENDERS

L1 Low fuel pressure sender
L2 Low oit pressure sender
L3 Max air pressure sender
L4 Thermal switch for engine cooling electromagnetic coupling
L5 Thermal switch for engine coolant max temperature warning lamp
L6 Thermal switch for engine coo'ling electric fan
L7 Engine coolant temperature gauge sender
L8 Oil pressure gauge sender
L9 Fuel level gauge sender
L10 Sender for, engine coolant temperature gauge and max temperature warning lamp contact
L11 Retarded rotor arm cut-out pressure switch
L12 Engine oil level sensor
L13 Windscreen washing liquid level sensor
L14 Engine coolant level sensor
L15 Fuel flow sensor
L16 Rev counter pulse generator
L17 Speedometer pulse generator
L18 Load sender
L19 External temperature sensor
L20 Photoelectsic cell
L21 Pierburg valve (Solenoid valve regulating the supercharging pressure)
L22 Knocking sensor
L23 Potentiometer
L24 Coolant temperature sensor for ignition advance adjustment
L25 Thermal switch for engine coolant temperature
L26 Vacuum sensor
L27 Temperature sensor
L28 Front right brake sensor
L29 Front left (brake sensor
L30 Rear right brake sensor
L31 Rear left brake, sensor
L32 Supercharging air 'pressure sender
L33 Two-level thermal: switch

M: SOLENOIDS - SOLENOID VALVES

MI Fuel tut-off solenoid valve
M2 Injection pump solenoid valve
M3 Solenoid with injection pump fuel tut-off microswitch
M4 Fast idle solenoid
M5 Engine stop solenoid
M6 Fuel pipe closing solenoid
M7 Door opening/closing solenoid
M8 Auxiliary air device (for A/C equipped car)
M9 Pierburg solenoid 'valve (for idle r.p.m.)
M10 Brake fluid adjustment valves
MI 1 Main A.B.S. valve

N: ELECTRONIC DEVICES - INTERMITTENCES'- TIMERS

N1 Electronic ignition module
NIa Electronic ignition module A
NIb Electronic ignition module B
N2 Connector for Marelli module,
N3 Capacitor for electronic ignition
N4 Connector for Bosch module
N5 Tachymetric switch device
N6 Pre heatin'g glowplug timer
N7 Trip Computer
N8 ALFA ROMEO Control

R: SAFETY DEVICES

R1 Seat belt device
R2 Catalytic muffler temperature indicator
R3 Thermocouple for catalytlc muffler temperature detection
R4 Buzzer signalllng unfastened seatbelt
R5 Buzzer signalllng open door
R6 Odometer
R7 Seat belt warning lamp
R8 30,000 mile warnlng lamp
R9 Push-button switch on seat belts
R10 Catalytic muffler maxlmum temperature warnlng lamp
R11 Front left door swltch for seat belt devlce

S: ELECTRONIC INJECTION

S1 Injection control unlt
S2 Relay set
S3 Electrolnjectors
S4 Cold start electroinjectors
S5 Air flow sensor
S6 Accelerator throttle switch
S7 Engine coolant temperature sensor
S8 Thermo-time switch
S9 Supplementary air valve
S10 Lambda probe
S11 Motronic control unit
S12 Motronic relay
S12a Fuel pump Motronic relay
S12b Motron'ic relay with'diode
S12c Timing variator device Motronic relay
S12d Auxiliary Motronlc relay
s13 Timing sensor
S14 Rev sensor
S15 Timing variator devlce
S16 Altitude compensation device
S17 'CEM control unit
S17a CEM control unit whlte connector
S17b CEM control unit black connector
S18 Throttle angle sensor
S19 Hall sensor
S20 Deton sensor
S21 Throttle actuatoi
s22 Electroinjector terminal
S23 Electroinjector resistor
S24 Electroinjector terminal board
S26 Injection system
S27 Lambda probe resistance
S28 Injection control relay
S29 Minimum adjustment actuator
S32 Lambda probe coder

T: DIAGNOSIS

T1 ALFA TESTER connector
T2 "Flashing Code" diagnosis connector

GROUP 49

CONTENTS

(*) Refer to "WORKSHOP MANUAL Alfa 33" VOLUME I
and VOLUME II - Group 49

GENERAL INFORMATION

WHEEL ALIGNMENT

CAUTION:
The technicians assigned to the repair and replacement operations of sheet panels, shall always take into account, content of the remaining part of the "Workshop Manual" in order always to maintain original quality and functioning conditions of car as a whole. As restoratio'n of car correct alignment is of particular importance, in the following part are provided the data relevant to geometry of both front and rear suspensions. For any further information. refer to the specific Groups.

Wheel alignment is measured with car under nominal height (see: Group 00).

1. Front axle and suspension

Features / Model		33 ● * 33 1.3 33 1.3 S 33 1.5 TI 33 1.5 axa	33 1.7 ● 33 1.7 IE 33 1.7 ● Electronic injection	33 1.8 TD
Toe-out Toe-out angle	mm (in)	M – H = 4 ± 2 α = 10′		M – H = 2 ± 2 α = 10′
Rim diaineter	mm (in)	0 = 340	0 = 365	0 = 340
Camber angle		β = – 1° ± 30′		β = – 1° 55′ ± 30′
Caster angle		γ = 2° ± 30′		γ = 1° ± 30′
Max steering angle	External angle	δ_1 = 27° 50		δ_1 = 29° 3 3
	Internal angle	δ_2 = 33° 45′		δ_2 = 35° 10′

2. Rear axle and suspension

Features / Model	33 ● * 33 1.3 33 1.3 S 331.s TI 331.5 axa 33 1.7 ● 33 1.7 ● Electronic injection 33 1.7 IE	33 1.8 TD
Toe-in angle	α = – 20′ ± 10′	α = 0° ± 25
Camber angle	β = 0° ± ‘25	

(*) Not marketed in all countries with 1.2 engine.

GROUP 49

CONTENTS

(*) Refer to: "WORKSHOP MANUAL Alfa 33"
-VOLUME I and VOLUME II - Group 49

GENERAL 'INFORMATION

WHEEL ALIGNMENT

CAUTION:,
In order to maintain 'the original quality and functioning of the vehicle as a whole. technicians must always keep in mind and refer to the other parts of "the Workshop Manual". However. as correct alignment of the vehicle is of particular importance, the data relating to the geometry of both front and rear suspensions is given below. For any further information refer to the specific groups.

Wheel alignment is measured with carat nominal height (see: Group 00).

1. Frotit axle and suspension.

Features \ Models		Sport Wagon 33 1.3 S	Sport Wagon 33 1.7 ⊕ / 33 1.7 ⊕ Δ	Sport Wagon 33 1.5 4x4 / 33 1.7 4x4 A	Sport Wagon 33 1.8 TD
Toe-out	mm	M - H = 4±2			M - H = 2 1 2
Toe-out angle		a= 10'			a= 10'
Rim diameter	mm	340	365 (1)	340 365 (1)	340
Camber angle		$\beta = -1° \pm 30'$			$\beta = -1°55' \pm 30'$
Caster angle		$\gamma = 2° \pm 30'$			y = 1° ±30'
Max steering angle	External angle	$\delta_1 = 27° 50'$			$\delta_1 = 29° 33'$
	Internal angle	$\delta_2 = 33° 45'$			$\delta_2 = 35° 10'$

(1) With 5½ J rim x 14 rim

2. Rear axle and suspension

Features \ Models	Sport Wagon 33 1.3 S	Sport Wagon 33 1.7 ⊕ / 33 1.7 ⊕ Δ	Sport Wagon 33 1.5 4x4 / 33 1.7 4x4 Δ	Sport Wagon 33 1.8 TD
Toe-in angle	a = - 2 0 ' ±10			a = 0° ±25'
Camber angle	$\beta = 0° \pm 25'$			

(A) With electronic injection engine for countries where antipollution regulations are in force.